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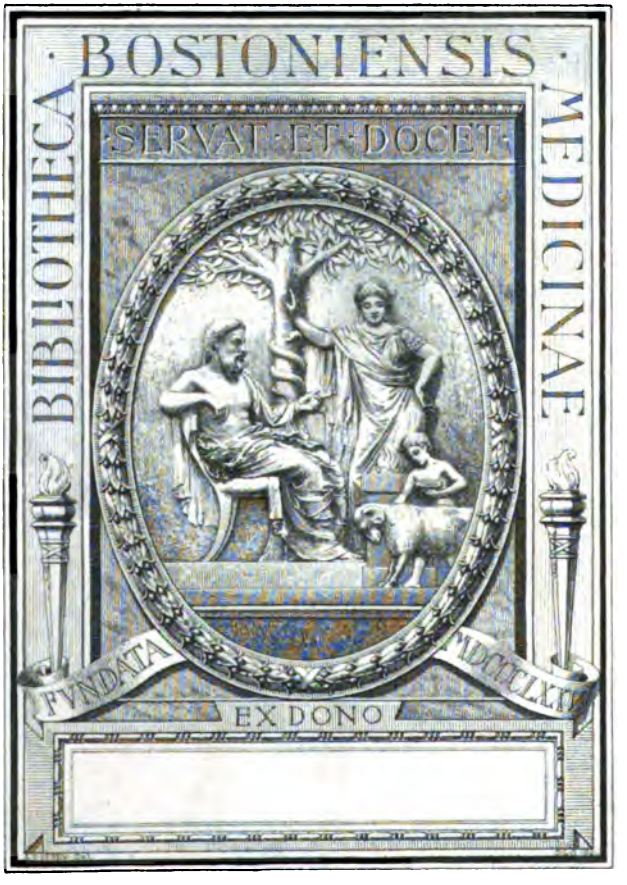
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THE SCOTTISH
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THE MEDICO-CHIRURGICAL SOCIETY OF EDINBURGH FIFTY YEARS AGO[1]

Valedictory Address

By JOHN CHIENE, C.B., Retiring President

GENTLEMEN,—My term of office has come to an end, and I have now the pleasing duty to thank you for your invariable courtesy to me personally, and to say a few words of the nature of a *Vale* or farewell as your President.

Looking back on past addresses by my Presidential forbears, the majority have dealt with the work of the Society during the term of Presidential office of the speaker.

This method has never appealed to me. "No age can write its own history." The work recently done by this Society cannot be correctly judged by me, at any rate. It is too recent. I am too near to it.

Fortunately I have heard, as an example for me to follow, valedictory addresses from your Presidents taking a more distant view, sometimes looking back, sometimes looking forward. I avoid the latter course; it is too dangerous, and I for a moment would like to look back in the annals of the Society.

This is a year of centenary celebrations: John Knox, Sir Thomas Browne, Trafalgar, the Royal College of Surgeons of Edinburgh, and the Royal Medico-Chirurgical Society of London.

All are interesting. Every true Scot is a theologian; it is in his blood. We don't object to a fight. As members of the medical profession the quater-centenary of our College and

[1] Delivered Nov. 1, 1905.

the tercentenary of Sir Thomas Browne specially appeal to us. I am tempted to-night to linger over Sir Thomas Browne. I cannot begin, because I would find a difficulty in ending.

A cotemporary of Wm. Harvey and Izaak Walton, I always think of these three men together; and the great lesson, of all importance in this age of hurry and putting other people right, that they seemed to me to teach is, the value of time for contemplation and tolerance. But I pass them all by; and although our Society cannot yet hold its centenary, I can, to-night, ask you to look back for fifty years. I think I am tempted to this date when I look at the names of the men who were then the active members in this Society. I find men whom I looked up to in the early sixties as my teachers, and if there is anything that seems to me to appeal to the best in us, it is to place on record our thanks to those who have influenced us in our youth. An old favourite of mine, Marcus Aurelius Antoninus, Imperator et Philosophus, begins his simple story of his life with such a recital. One of his axioms is, "a man should always have in his mind some one or other of the ancient worthies." In 1855, some of these men, of whom I wish to say a few words, were pointed out to me by my seniors, when I was an Academy schoolboy, as worthy citizens of no mean city. Then, as now, there were the successful men worked off their legs, seeing this one and that one; and there were the quiet, easy-going men, who, perhaps, spent a happier life, at any rate a more restful life. Both had their duties and their responsibilities: "the universe has need of all men," or, as the old Scottish lady said, "it taks aw kinds o' buddies to mak a world."

In 1855, Dr William Sellar was your President. I remember him living in Northumberland Street, and even when I was a boy he appealed to me. I knew him well by sight. All men spoke well of him. There was something kindly, Pickwickian, in his appearance. I never heard that he had much practice. I think he had boarders, possibly apprentices, who attended the medical classes in the College. I would imagine that they had an easy time. It was about this time that the profession entertained him to a banquet in the Granton Hotel. These were the old ferry days, when Granton was an important port, and when the Granton Hotel was as the Lord Warden in

Dover. Nowadays that route to Fife is in its first tunnel part given up to the growth of mushrooms. From Scotland Street to the sea there is now only mineral traffic!

Of the Vice-Presidents I gladly recall my first teacher in Surgery, the late Professor Miller, a polished, courteous gentleman, whose honesty of character, and constant desire to do the right thing, endeared him to his students.

Amongst the Council I note H. D. Littlejohn, *semper juvenis*. He was at that time the editor of the *Edinburgh Medical Journal*, and I thank him for the fulness of the reports of the Medico-Chirurgical Society. His work fifty years ago has made my work easy to-night. He never thought when he took care to have good reports of the meetings that the President of 1905 would directly benefit from his devotion to duty fifty years ago. Good work, whenever and wherever done, will always bear fruit sooner or later. He began his duties as editor in July 1855, and in the second number he very well illustrates the spirit in which he worked by the kindly support given to the Medical Benevolent Fund. He says: "In this an early number of the *Edinburgh Medical Journal* we feel a peculiar pleasure and recognise a singular, although almost accidental, fitness and propriety in noticing the operations of the Medical Benevolent Fund." "The medical profession is essentially a benevolent one, and we hesitate not to assert the almost unbounded scope to which extends the private and unheard of charity of its members;" and he very truly points out "that the object of this fund is to obtain, to systematise, and to facilitate the benevolent action of the profession towards itself," and he speaks of "the active benevolence of the profession towards its own members as a solemn duty incumbent on it."

It will always be well with our profession when such are its guiding principles.

On the Council I note a man who, as a teacher of Pharmacy and Minor Surgery, was a well-known figure in my student days, Dr David Gordon, whom we irreverently called "Longus Colle." He, I remember, had a special pair of tooth forceps which could with great advantage be applied to every variety of tooth.

Another member of Council, Daniel Rutherfurd

Haldane, was my teacher in Systematic Medicine in 1864. He was in 1855 Pathologist to the Royal Infirmary and Lecturer on Pathology in the Extra-Academical School. I look back to his lectures as the most polished, concise, and practical course of instruction in Medicine—in the wide sense of the term—to which I ever listened. He had that all-important faculty in every teacher of being able to apportion out his subject with a precision and due sense of the proper proportion of every branch of the subject, so that without any hurry at the end of the session we each felt that Dr Haldane had made the very most of the time at his disposal.

Dr Alexander Wood was another member of the Council. I knew him personally, and he often said an encouraging word to me when I was a student. I had no experience of him as a teacher, but he will always be remembered as the man who introduced the hypodermic syringe to the notice of the profession.

It was in this year that the famous struggle for the Chair of Practice of Physic took place. It was a triangular duel—Bennett, Laycock, and Wood; and Wood ran Dr Laycock a very close second—Laycock 17, Wood 15, votes in the Town Council, which then had the patronage in its hands.

The Treasurer of the Society was Dr John Struthers, then an extra academical lecturer on Anatomy. Two years before he had taken Prof. Goodsir's class during his absence from illness. He afterwards became Professor of Anatomy in Aberdeen, and after his retirement came back to Edinburgh to take an active part as a manager in the Leith Hospital and Edinburgh Royal Infirmary, and to fill with energy the Presidentship of the Royal College of Surgeons. All his life he lived fully, and in the records of the Medico-Chirurgical Society there was no more active member than John Struthers.

The Secretaries of the Society were Dr W. T. Gairdner and Dr Warburton Begbie, who, along with Struthers, took a most active part in the meetings of the Society.

Of Dr Gairdner, now Sir William Gairdner, who is still with us, and acutely interested in everything connected with the profession of which he is an ornament, it may truly be said that from the day on which he became a physician in the Royal Infirmary until he retired from the Chair of Medicine in

Glasgow, he was always in the forefront, and, in my opinion, the greatest physician in Scotland.

He was also, when in Edinburgh, like Dr Sellar, an inhabitant of Northumberland Street, and a personal friend of my father's. I remember well the first day I spoke to him in the dining-room at No. 27, my father's house. Then an Academy boy, it must just have been 50 years ago. I had some trifling ailment, I forget what, and he came to see me and advised a rest from school for a time. I fully appreciated the kindliness of his prescription. From that day I have always felt a respect and love for Sir Wm. Gairdner.

In 1855, medical politics were burning questions, and I was early taught the fact that Dr Gairdner in those days was a reformer who did not always see eye to eye with the Professoriate—he was one of the "outs," and took a friendly interest in the "ins," which did not always meet with their approval. The two forces must always be at work as long as the world lasts—those who desire to change the steam power, those who act the part of the Westinghouse brake and think things are very well as they are, and that great care must be taken to proceed cautiously. A very distinguished professor travelled one day to Fife with my father, and as they left Burntisland he pointed to an unsigned article in the *Scotsman* and said with a shrug of his shoulders, "the work of Willie Gairdner." That day at dinner my father told me the story. "No age can write its own history" is specially applicable to Sir W. T. Gairdner. We don't really yet see the inherent greatness of the man, the very nearness of the subject renders a just estimate impossible. You cannot estimate the height of a hill by standing in the near valley and seeing only the top of the first knoll; even if you climb to that point you only see another rise—the summit is not yet.

Of Warburton Begbie, the dear friend of many of us, whose short meteoric career is well known to all who lived before 1876, I will find words with difficulty to be your efficient mouthpiece on this occasion.

I think when I looked up the minutes of 1855, and found Warburton Begbie was the Junior Secretary, it appeared that, in the language of the philosophers, "now all these points could never have been compassed without a protection from

above, and the Gods presiding over fate"—in other words, I felt that I was a fortunate man to be permitted to put on record to the present generation a few aspects of Warburton Begbie's character, recalling, if possible, what he was to many that knew him, and telling the new generation of that physician who, after he served as a physician in the Infirmary from 1855 to 1865 (the year I graduated), and more especially after his father's death in 1869, until his own too early death in 1876, was the man whom everybody must see if he was seriously ill. It was said, in a county to which he so often went, "Begbie has been sent for," and the friends of the patient knew that all had been done that could be done.

He was killed by his work and worries; he was worn out at 50.

What lesson did Begbie teach his pupils? The value of sympathy, courtesy, and concentration. He was ever ready—however tired—to help anyone in suffering; his professional brethren and his students went to him in all their troubles; how gentle and kind he was. He taught us another lesson—to believe in your power of being able to help, however apparently hopeless the case, and he also taught us to do what lay immediately to our hand with all our might. There was no "impatience of attention" in Warburton Begbie. He never checked the patient telling his own story in his own way. He never jumped in and said he knew until he had heard all, and then he spoke with confidence. What a blessing he was to the friends of the patient—a word from Begbie often gave more comfort than a homily from another.

He had, above anyone I ever met, the faculty of impressing each of his patients—no matter what his status in life—with the feeling that his case absorbed all his interest.

Begbie's life seemed a long one—he did so much in the years. He only got into the thick of it, so to speak, after he left the hospital. I never remember him being away a day. He was always among his patients. He generally spent three hours in the hospital—12 to 3—and then crossed Infirmary Street to his lecture on Practice of Physic. There was nothing of the drill sergeant about him—he ruled by love. He was what the Americans call a lovely man. He possessed three great faculties—a deep reverence for the past, a profound

knowledge of the present, and an intense belief in the future. He had a wonderful combination of qualities, all of which went to making him the beloved physician.

I am indeed fortunate in bringing James Warburton Begbie before the junior members of the Medico-Chirurgical Society.

The year 1855 should be remembered in this school. It was the year in which Warburton Begbie, Joseph Lister, and Henry Littlejohn began their teaching career in Edinburgh as extra-academical teachers. The extra-academical school has been the nursery of many men who have made their mark in our profession. May it ever prosper. I gladly place on record how much I owe to it. It was my foster-mother when I needed help, and I trust I have never forgotten a remark made to me by an old extra-mural friend who lectured with me in the old Nicolson Square class-room when I was made Professor. "See that you don't kick away the ladder by which you have climbed." The ladder rests on the building into which I have climbed—in other words, both are essential.

The welfare of the extra-academical school is intimately bound up with the welfare of the University, and the welfare of the University on its medical side is bound up in a prosperous extra-academical school.

This is perhaps not the place, nor is this the time, to speak of the medical school, but as I see teachers before me and many who will be teachers, I cannot but tell you my opinion that we must bind the two elements more closely together. We have seen within recent years many new centres of medical education arising in the old country and in the empire beyond the seas. We cannot hold our position on the old lines, we must reorganise our forces—"What was good enough for twenty years ago is not good enough for to-day."

More closely bound together, more especially in the hospital, we will certainly be a stronger organic whole and more able to contend in all friendliness with our opponents who are our own offspring. Let us avoid if possible the fate of the mother scorpion of Brazil. We have to see that, after bringing forth a brood of young scorpions, we are not eaten by our own progeny; or, as Sir Thomas Browne puts it, "I

perceive a man may be buried alive and behold his grave in his own issue." For "man" read "University."

There is no necessity to go systematically over the work done during Dr Sellar's presidency. Let me only indicate the nature of the work. We find Professor Christison upholding the rights and privileges of the medical witness, and pointing out that unless some protection against the attacks of counsel is given that it will be difficult to get medical men to come forward.

He also asks what is your duty when you suspect a case of chronic poisoning; his verdict is, tell the victim of your suspicions, not the civil magistrate, nor the suspected person.

Mr Spence read a most interesting paper on a case of Hernia, in which strangulation was due to an irregular obturator artery. At that meeting the preparation of a similar case in which the artery encircled the neck of the sac and was not wounded—the operation having been performed by the late Dr R. T. Mackenzie—was shown by Dr Struthers. Dr Mackenzie's death had recently occurred in the Crimea, where he had gone to the seat of war as a volunteer.

Mr Spence's classical paper on Cario-necrosis was read before the Society at this time.

Dr Wm. Broadbent, when he was Professor Syme's house-surgeon, I think, read a paper on, and showed a case of, Tubercular Leprosy (or elephantiasis Græcorum) occurring in a patient from Stornoway, which elicited an interesting discussion, in which it was stated that leprosy was met with in Austria, and Dr Simpson (afterwards Sir J. Y. Simpson) stated that he had the day before seen a leper in his consulting-room, and he asked the question if the disease was returning again to this country? It was pointed out that the Swedes spoke of prevention by the "Scottish method," namely, castration of the males suffering from the disease. Dr Simpson hoped our Swedish friends would understand that this method of dealing with the disease was not now advocated in Scotland.

Then we have Dr Warburton Begbie on Rheumatism and Chorea, a subject in which he took a deep interest. I remember well his interest in such cases when I was a clerk in his wards in 1864.

Dr Keith read a paper on "Manual Strangulation," which,

knowing the doctor only as an authority on Midwifery, I took to be a paper dealing with some obstetrical condition, but it was an interesting medico-legal contribution—a subject which Dr Keith taught before he became a teacher of Midwifery.

There are also two cases of death under the administration of chloroform, one on the operating-table in the hands of Dr Mackenzie of Kelso, and the other in the dentist's operating-chair, a patient of Dr Nesbit's, and an interesting discussion arose as to the cause of death.

Dr Benjamin Bell has a paper on "Dilution as a principle of Therapeutics." It is in my opinion a most interesting paper. He presses for small doses in a high state of dilution; in fact he tries to imitate Nature in the Chalybeate springs and in natural purgative mineral waters.

The hæmorrhagic diathesis, excision and examination of the knee-joint, chylous urine, operation for cancer of cervix, all occupied the attention of the Society; and Dr Alison, Emeritus-Professor of Practice of Physic, had a paper on "Bleeding and its Values," apparently one of the last struggles of the decay of faith in the value of bleeding in all cases of acute inflammation. Dr Bennet did not attend the meeting at which the paper was read. It was the play of Hamlet without Hamlet. The discussion hinged on the change of type in disease, and that as the eruptive fevers varied in severity in different epidemics, so possibly there was a cycle of severity in inflammatory conditions.

Lister's first paper in the Medico-Chirurgical Society was read at this time. It was on a remarkable case of Hydrocele. Even in those early days Mr Spence was hypercritical of Mr Lister's views. Then, as now, interesting cases and interesting specimens were shown. Very often the meetings were entirely devoted to the exhibition of clinical and pathological material.

Occasionally a paper of general interest relieves the purely professional work of the Society, such as that by Dr Campbell Stewart of New York on "The Medical Schools in America." We learn that then, as now, all forms of illegitimate practice were rampant in America, illustrating the great law that the greater the crowd, the less is the mental stability of the individual in the crowd.

I have said enough to show that our predecessors were active and energetic, desirous to learn, keen in argument, and liked above all things a thorough thrashing out of any subject at all costs. Perhaps nowadays we don't say all we think in the desire to be all things to all men. Perhaps it is well not to say all we think, but surely we can hold our tongues.

I notice in the Society a marked change ever since I was a member. We hear no longer of certain schools which pin their faith to one man ; a Simpson man, a Syme man, a Christison man no longer exist. We are more prepared to see good in everything, and hence good in everybody. I think there must be a preponderance of good in such an attitude towards our neighbour.

Three days ago I happened to be reading Emerson's paper on "Thoreau." (Thoreau, fortunately, is pretty well known to most men, but if it is a new name to anyone present, may I say, don't hesitate to make his acquaintance right speedily.) Thoreau was perhaps too critical, but there is much general truth in this sentence: "Not a particle of respect had he for the opinions of any man or body of men, but homage solely to truth itself"; and as he discovered everywhere among doctors (all sorts of doctors) some leaning towards courtesy, it discredited them in his eyes, a frame of mind not altogether good, because apt to be intolerant. At the same time, if associated with that spirit which "will have no disciples"—in other words, neither giving nor asking a blind belief—then possibly most good will arise in discussion in medical societies and otherwise.

My time is more than up.

What are the lessons of the work of this Society fifty years ago?

The world knows, or thinks it knows, more now than then.

A temporal bone was shown from the post-mortem room from a case of middle-ear disease with an abscess in the temporo-sphenoidal fossa ; they had no idea of opening the abscess.

Photography was first introduced in this year to the notice of the members.

The double stethoscope was shown for the first time on the same day.

Is a condyloma a specific disease, or is it a manifestation of the disease called syphilis?

A cleft palate was shown in which the treatment was a small eschar at the angle of the cleft, resulting in an ulcer which contracted as it healed, the process being repeated several times.

Things were then said which are now firmly believed, but which, said then, fell on barren ground and bore no fruit. Dr M'Cormac of Belfast communicated a paper on Tubercle to the Society on May 20, 1856, to the effect that tubercle is a vice of respiration, that the respiration of a vitiated atmosphere supplies all the conditions necessary for the development of tubercle, and he puts on record these words: "The problem to be solved was how best to secure, by day and night, air as pure as the great body of the atmosphere." Here in a sentence we have the open-air treatment of the present day. No one supported his view; in fact, it is the only paper which received no compliments. Kindly words were spoken of all the others; this only drew forth a warning. Things are being said now which fall on barren ground; the crowd is not yet ready for them.

I have enjoyed this desultory dive into the past, and perchance I have recalled to some of my hearers and compeers our early days when our world was young. For the other and major portion of my audience I can only say that I know nothing as a recreation or a solace in the stress of work—as on them the stress must now fall—better than a little time given to the contemplation of the ancient worthies. "There are three things the wise man ought to reverence: the laws of heaven, great men, and the words of good men." When Confucius penned these words he doubtless was thinking of his ancestors. As in the East, we find that ancestor worship was a most important factor in bringing to a successful issue the recent great struggle, happily now ended; so possibly in the battle of life in which nowadays the struggle is a severe one, a little ancestor worship may be a helpful thing.

Such a retrospect teaches us another lesson, that our time here must come to an end; some in early life, some in old age, some apparently when they can least be spared, but all at the best and most proper time, we may be sure of that. We

have all lost dear friends in this Society since I took the chair. We each sympathise with the other ; and for the near relations of those who have crossed the river, I am sure your heartfelt sympathy will be freely given.

I now hand over the pleasures and responsibilities of my office to my successor, in the full assurance that the best interests of the Medico-Chirurgical Society will be in safe keeping.

WITHDRAWAL OF THE LIQUOR AMNII: A CAUSE OF FŒTAL DEATH AND PLACENTAL CHANGES, AN EXPERIMENTAL INVESTIGATION IN THE RABBIT[1]

By B. P. WATSON, M.D., F.R.C.S.,

Freeland Barbour Fellow ; Late House-Surgeon, Royal Maternity Hospital, and University Gynecological Ward, Royal Infirmary, Edinburgh

(From the Laboratory of the Royal College of Physicians, Edinburgh)

THE experiments upon which the following paper is based were undertaken in the first instance in the hope that they might add something to our knowledge regarding the origin of the liquor amnii. Although they have failed to throw much light on this difficult problem, they have given interesting results with regard to fœtal death, and the changes which the dead fœtus and its placenta undergo while retained *in utero*. To a consideration of these the main part of what follows is devoted.

The animals selected for experiment were rabbits. They were chosen because of the facility with which they can be obtained and bred, and also because the structure of the placenta has been very fully worked out by Minot (1), Duval (2), and Chipman (3), the latter especially giving a most minute and detailed account of the whole gestation period.

Rabbit's Uterus.—The rabbit's uterus consists of two

[1] Read before the Edinburgh Obstetrical Society, being part of a Thesis presented to the University of Edinburgh for the degree of M.D., and awarded a gold medal. The expenses of the research were partly defrayed by a Carnegie Grant.

cornua, entirely distinct and separate from each other except at their vaginal extremities, where the apposed walls are fused for a short distance. Each opens separately into the common vagina. At the other extremity they are continuous with the Fallopian tubes, which are convoluted and much narrower than the uterus proper. The muscular coat of the cornua is in two layers, an outer longitudinal and an inner circular. These layers are of equal thickness, and between them is some loose connective tissue.

The mucous lining is raised into a series of folds, two of which, situated one on either side of the mesometrium, are especially large and are known as the "placental" folds, as it is by their hypertrophy that the maternal part of the placenta is formed when an impregnated ovum comes in contact with them. Ovulation is said as a rule to occur a few hours after insemination, and from three to nine ova are discharged at one time. These entering the oviduct are fertilised, and continue to travel down the duct into the uterus, which they reach about the third day. The ova are spaced out at more or less regular intervals in each cornu, and as the intervening parts remain of almost the same diameter as before impregnation, the horn becomes divided up into a series of sacs, each containing an ovum. As a rule the sacs in the two cornua are unequal in number, and all the sacs may not be of the same size, this being due to the fact that some of the ova are later in being fertilised than the others. In carrying out the experiments, care was always taken to select for observation and control sacs which were of equal size, and so presumably of the same age. As pregnancy advances the sacs increase in size at the expense of the intervening portions of the horn. Parturition occurs thirty days after insemination.

Method of Experiment.—The method of carrying out the experiments was as follows:—The animal, having arrived at the desired period of gestation, which varied in different cases, and which was calculated from the day of insemination, was anæsthetised with ether and fixed down on its back to a holder. The abdomen was shaved and thoroughly cleansed with a solution of lysol. A piece of fine gauze wrung out of warm lysol solution was then spread over the animal so as to cover abdomen and limbs. All instruments used were

thoroughly sterilised. A linear incision 1½ inches in length was made in the middle line above the pubes, and the abdomen opened. The uterine cornua with their gestation sacs at once presented in the wound, and were expressed from the abdomen with as little direct handling as possible. It was necessary to have all the sacs completely in view in this way in order to select for experiment and control only those which were of the same size, and also in order to be certain of the exact position in the horn of the sac punctured. A warm, moist piece of gauze was placed over the extruded sacs, and one sac, or in some cases two or more, selected for aspiration. The syringe used was an ordinary glass serum syringe with a fine sharp needle. The needle was entered near the roof of the sac, and thus well away from the placenta, and great care was always taken to avoid injury to the fœtus either by the needle or by the fingers which steadied the sac. The fluid was then withdrawn, the amount varying according to the stage of gestation. A slight leakage occurred in some cases after the withdrawal of the needle.

In the earlier experiments this was all that was done, but in the later ones, owing to the necessity of obtaining a standard by which to judge of the placental changes induced, one of the normal sacs was in every case excised complete. This was not done in the earlier experiments for fear of causing abortion, but when this did not follow the simple operation with the necessary handling of the uterus during it, excision of a control sac was tried. The results were entirely satisfactory. The only animal which aborted during the investigation was one which was almost at full time at the date of operation. It is a remarkable fact that the rabbit's uterus tolerates such interference, a point which will be discussed later. The method of excising the sac was a very simple one. A double ligature was passed through the mesometrium opposite the centre of the sac, and this was tied on each side between the sac to be removed and that on either side. The sac was then cut away above the ligature. After returning the uterus into the abdomen, the abdominal wall was closed with through and through horse hair sutures and a collodion dressing applied.

The animals, as a rule, made a perfect recovery, only one showing any sign of sepsis, and it was at once destroyed. After

the lapse of a certain number of days, varying from three up to fourteen in the different experiments, the animal was killed by the administration of chloroform. The abdomen was immediately opened and the entire uterus excised, the vagina and mesometrium being previously ligatured to prevent the escape of blood from the placentæ. The uterus was hardened in formalin for twenty-four to forty-eight hours, and then the different sacs were cut across transversely and their naked eye characters noted. They were then prepared for embedding in paraffin and cut in serial sections.

Eight complete experiments in all were done, the period of pregnancy varying from the tenth to the twenty-first day, and the interval which elapsed between the operation and the death of the animal from three up to fourteen days. The stage of gestation at which the operation was performed did not affect at all the nature of the changes induced in the fœtus and placenta, so that the experiments form a progressive series in so far as these changes are concerned. Two of the experiments were performed at the twelfth and one at the tenth day of gestation, and in these the fluid aspirated was the yolk sac fluid. The amnion in the rabbit is not completely closed in until the tenth day, and does not become distended with fluid till after the twelfth, and up to this time the great part of the ovum consists of the yolk sac and its fluid contents. In the other five experiments, one performed at the fourteenth, one at the fifteenth, two at the sixteenth, and one at the twenty-first day of gestation, the fluid withdrawn was the liquor amnii, which at these dates occupies almost the entire space between the placenta and roof of the sac, the non-vascular part of the yolk sac wall becoming absorbed and the yolk sac ceasing to exist. The results obtained by the withdrawal of the yolk sac fluid in no way differed from those got by the aspiration of the liquor amnii.

Such in brief was the method of experiment: and now, without entering into a detailed account of each case, the general results obtained and the conclusions to be drawn therefrom will be indicated.

Results.—When the animals were killed, the sacs which had been aspirated were always found to be much smaller than the normal sacs. This was due to the fact that there had been no

resecretion of the liquor amnii and that the fœtus had died and so ceased to grow. This contrast between the normal and punctured sacs is well seen in Figs. 1 and 2.

The sequence of events after the withdrawal of the fluid, were it yolk sac fluid or liquor amnii, was—(1) death of the fœtus and subsequent degeneration, (2) placental changes, (3) arrested secretion of the liquor amnii.

These three results will be dealt with separately.

The Fœtus.

All the experiments resulted in the death of the fœtus in the punctured sac; further, death occurred almost immediately after the aspiration of the fluid, for the development of dead fœtus, as studied macroscopically and microscopically after the death of the mother, corresponded to that of the one in the normal sac excised at operation. This excision of the normal sac gave an exact method of verifying the time at which fœtal death occurred.

Cause of Fœtal Death. Since death occurred in all the cases it follows that the cause must be something other than the mere absence of the liquour amnii, for, as mentioned above, in three cases this was not interfered with. Great care was in all cases exercised to avoid direct injury to the fœtus by the needle, and I am convinced that in no instance was any such injury inflicted, for, had the fœtus been punctured, the fact would have been easily recognised at the time, and at the subsequent post-mortem examination signs of it would have been present. In no case was this so.

In the cases in which the amniotic fluid was withdrawn there is no direct evidence as to the cause of fœtal death. From a study of the placenta, as will be indicated later, it is quite clear that the death of the fœtus was not due to any degenerative changes in it. It is rather to be looked for in the arrest of the circulation, consequent upon the general alteration of pressure within the sac following on aspiration of the fluid. In one of the cases in which a sac was excised ten minutes after aspiration, it was noted that the uterine wall had contracted so as to follow up the collapsed amniotic sac, and that this contraction had resulted in the compression of the

placenta from side to side, so that the ectodermic columns were closely compressed, and that in consequence many of the fœtal vessels in the mesoderm had their walls approximated and were partly emptied of blood. This compression of the placenta was a constant feature in all the punctured sacs, as was also the compression and partial obliteration of fœtal vessels in the mesoderm (Figs. 2 C, 7 and 8). In none of the cases was it evident that a complete arrest of the fœtal circulation in the placenta had been thus effected, but in all there was marked evidence that the yolk sac circulation, which in the rabbit persists up to the end of gestation, had been interfered with. Robinson (4) has shown that in rats and mice the yolk sac is an important nutritive organ which functions right up to the end of gestation. Although the arrangement of the yolk sac in the rabbit almost certainly points to it taking a smaller share in the nutrition of the embryo than does that of the rat and mouse, still the circulation in it must be of some nutritive or respiratory importance, and any interference with it such as resulted from these experiments, must affect the vitality of the fœtus. The arrest of the vitelline circulation, consequent upon collapse of the yolk sac wall, was then probably one of the causes of fœtal death, the other being the retarded circulation in the fœtal part of the placenta. This explains why death of the fœtus occurred both after withdrawal of the yolk sac fluid and of the liquor amnii.

The mere absence of liquor amnii may have played a part in the latter cases, but on this point I have no direct evidence to adduce either for or against. That the liquor amnii is not in all cases necessary for the life of the fœtus is shown by cases of extramembranous development of the human embryo, several of which have been recorded. In these cases the amniotic sac is represented by a small pouch situated on the surface of the placenta, close to the insertion of the cord, while the fœtus lies outside it, but may still be alive at or shortly before the time of birth.

The changes which the dead fœtus undergoes were very characteristic. The normal pink translucent appearance of the living fœtus gives place to the dull grey aspect of the degenerated one, while the rounded contour is lost, the dead fœtus

becoming flattened out between the face of the placenta and the upper wall of the sac. In its flattened appearance it closely resembles the fœtus papyraceous of occasional occurrence in the human subject. (Figs 2 and 3.) In this connection it is interesting to note that no case of fœtus compressus is known in the human subject apart from twin pregnancy, where the pressure of one fœtus flattens the other. The flattening of the fœtus in these experiments has, on the other hand, been due to the pressure of the uterine wall itself against the face of the placenta.

The exact significance of the pathological appearances of the fœtus compressus is a disputed one. Ahlfeld and Schatz (5) hold that the flattening is an essential teratological condition. The latter from a study of seven cases comes to the conclusion that as a result of the imperfect blood supply of one of the fœtuses in some cases of uniovular twins the nutrition of that twin suffers, and there is oligo-hydramnios. This together with the thinness of the fœtus allows of the latter being readily compressed.

Ballantyne (6), on the other hand, regards the flattening as of secondary occurrence following the death of the fœtus from such causes as insufficient circulation in the common p'acenta or from placental hæmorrhage, and subsequent absorption of the liquor amnii. The results of these experiments entirely bear out this latter view, viz., that the first thing to occur is the death of the fœtus, and that after softening and degeneration have begun it becomes flattened out. That is what one would naturally expect, for the natural resilience and elasticity of the living tissues are sufficient to prevent any marked deformity which, on the other hand, is readily produced when these are lost as the result of death and degenerative changes.

In none of the cases was there any swelling of the tissues or accumulation of sanguinolent fluid in the abdomen such as is met with in macerated fœtuses retained in the human uterus bathed in liquor amnii. Hourlier (7), who has examined a number of such cases, explains the accumulation of fluid as resulting from breaking down of blood clot which has formed in the pleural and peritoneal cavities as a result of the death of the fœtus from asphyxia. There have been no such hæmorrhages in any of my cases.

By microscopic examination a progressive series of degenerative changes can be traced in the various tissues and organs as the time of retention of the dead fœtus *in utero* lengthens. The changes begin early in all the tissues, but the rate at which it advances varies considerably in the different organs and histological elements.

By the third day the surface epithelium is entirely lost. The protoplasm of the epithelial cells swells up and becomes degenerated at the margins, while the nuclei become granular. In this way the attachment to subjacent structures is loosened, and large areas become detached and thrown off. The connective tissue cells are early affected. They undergo a process of granulation and breaking down, while the nuclei become first swollen and then granular, and finally disappear. The liver and heart are the organs which undergo most rapid degeneration and disintegration. The kidney and pancreas on the other hand break down more slowly. The nature of the change is the same in all cases, namely, a swelling of the cell protoplasm and a granular degeneration of the nucleus. The connective tissue cells resist longer than the special histological elements of the various organs. The cells of the pancreatic glands resist the process of disintegration longer than any others.

Pathology of the Retained Placenta.

The rabbit's placenta is easily differentiated into its two parts, fœtal and maternal. The latter is formed by the subcutaneous tissue of the two placental folds of the mucosa and is therefore a bilobed organ. The connective tissue cells proliferate, and those round the blood-vessels become transformed into large decidual cells, which are at first uninucleated. The capillaries enlarge into blood sinuses with a swollen endothelial lining. Towards the later stages there is a leakage from the blood sinuses, so that fibrin is deposited round their walls and extends out among the decidual cells. These cells at the same time become polynuclear, and towards the end of gestation undergo a process of degeneration. In a zone of the placenta next the uterine attachment the decidual cells remain uninucleated throughout, and the sinuses are always small with no

fibrin deposit round them. At about the mid term of pregnancy this zone is clearly differentiated from the rest of the maternal placenta. From this time onwards the uninucleated decidual cells begin to shrink, and the tissue becomes more and more attenuated. This zone is known as the "zone of separation," as it is through it that the placenta becomes detached at parturition.

The fœtal part of the placenta consists in the early stages of solid columns of ectoderm, which extend along the fibrin-lined maternal sinuses, replacing the endothelium. Into these solid columns of ectoderm the mesoderm extends, carrying with it the fœtal vessels and dividing the columns up into finer and finer tubules. This subdivision of the ectoderm goes on till about the twenty-sixth day, by which time the placenta is fully elaborated, and all that separates the fœtal from the maternal blood is a thin layer of ectoderm, which has now lost its cellular character and become plasmodial, and the fœtal capillary wall.

The changes which the placenta undergoes while retained *in utero* after the death of the fœtus will now be detailed.

The only changes observed in a sac excised ten minutes after aspiration of the fluid were compression of the two lobes of the placenta from side to side and the pressing together of the columns of ectoderm in the fœtal placenta, so that the mesoderm with its contained vessels was compressed. This resulted from the contraction of the muscular wall of the sac.

After an interval of three days the walls of the punctured sac are further thickened and the placenta more compressed, so that the fœtal part is distinctly less vascular in appearance than normal. At the same time there is a slight deposit of coagulated lymph in the mesoderm at the surface and in the substance of the fœtal placenta. In one or two isolated areas the ectoderm shows signs of commencing degeneration as evidenced by the deficient nuclear staining, but it still retains its power of penetrating the maternal tissues. The maternal placenta differs from normal only in the greater amount of fibrinous deposit among the decidual cells and the more distinct differentiation of the zone of separation, partly due to this and partly to the greater attenuation of the tissue itself. The placenta as a whole, therefore, three days after the death of the fœtus shows only slight departures from normal. It has gone on developing

along the normal lines, and in the case of the maternal part shows an accelerated development by the more extensive fibrinous deposit and more marked zone of separation, so that it has the appearance of a twenty-first or twenty-second day placenta instead of a nineteenth day one, the time at which the animal was killed.

After a five days' interval the same kind of changes are observed in the maternal placenta. There is more fibrinous deposit, and a more marked zone of separation as compared with the normal than is present after a three days' interval, while many of the vessels are fibrosed. As the area of fibrin deposit has increased, the decidual cells have changed from uninucleated into multinucleated, and some of the latter have degenerated, just as happens in the normal placenta. The fœtal placenta, however, now shows signs of degeneration. The mesoderm is extensively invaded by fibrin threads which in places form laminæ. The ectoderm in the centre is markedly degenerated, nuclear staining being lost, and the protoplasmic staining irregular. Although at the maternal surface the degeneration is less marked, the power of penetrating the maternal tissues is lost.

As the interval that elapses between the death of the fœtus and that of the mother lengthens from 5 to 7, 9, 10, 12, and 14 days, as in the remaining experiments, a progressive series of changes can be traced along these lines. The fibrinous deposit in the maternal placenta becomes more and more extensive and the fibrin laminæ denser, so that the decidual cells degenerate and disappear. The fibrin laminæ round the vessels become thickened, so that many of the latter are blocked, while the tissue forming the zone of separation becomes more attenuated as contrasted with the normal. The fibrinous deposit in the fœtal mesoderm becomes more marked, and after an interval of nine days begins to invade the ectoderm breaking it up and compressing it. The ectoderm undergoes a progressive degeneration, and ultimately almost completely disappears among the mass of fibrin which, after an interval of fourteen days, comes to make up the great part of the fœtal placenta.

It is thus evident that the changes in the placenta following on death of the fœtus are of an entirely different nature in the

two component parts—fœtal and maternal. The latter goes on evolving along the normal lines, and all the departures from normal are merely of degree, and are an expression of accelerated development. The fœtal placenta, on the other hand, undergoes processes which never occur in the normal sac, such as the deposit in the mesoderm by fibrin and coagulated lymph and the degeneration of the ectoderm.

The fibrinous deposit, which occurs in the maternal placenta, takes place in the same situations as in the normal sac, and there is no evidence to show that its mode of production differs in any way from normal, viz., by a slow leakage through the fibrin-lined walls of the maternal sinuses. The only difference is that it occurs more quickly and more extensively, and that this results in the more rapid transference of the uninucleated into polynucleated decidual cells, and the more rapid degeneration of the latter, so that a placenta, which is at, say, the 20th day presents appearances like those met with at the 22nd or 23rd day. At the same time the placenta increases in bulk in those cases where the operation has been done during the growing period.

This behaviour of the maternal placenta throws considerable light on the rarity with which abortion was induced during the course of the investigation. It is a remarkable fact that such interference as the uterus was subjected to in every case—the manipulation, aspiration of fluid from the sacs, and the complete excision of part of the cornu resulted in abortion in only one instance, and in that case the animal was at the 28th day. That abortion is prevented by the presence of other sacs on the proximal side of the punctured one, is negatived by the fact that when there is only one sac in the horn, and that is punctured as in one of the experiments, it did not occur (Fig. 1).

From the structure and mode of development of the maternal placenta, we should not expect it to be easily cast off in the early stages before the zone of separation has formed, as it is practically one with the rest of the cornu, with a broad base of attachment. The subsequent changes which it undergoes are for the purpose, firstly, of allowing a sufficient blood supply into which the fœtal structures may dip, and providing a tissue, fibrin, through which they can readily

penetrate; and, secondly, of providing a zone through which the whole may be cast off with a minimum loss of blood and destruction of tissue.

The latter phase of development has been accelerated in the placenta of all the punctured sacs, for in all of them there has been noted a development of the zone of separation, and an attenuation of its cellular elements in advance of the normal at the period examined. This I take to indicate a tendency to the earlier casting off of the dead ovum, and in one of the experiments this actually occurred, the whole ovum and maternal placenta lying free in the uterine cornu, the latter having been detached through the zone of separation at the twenty-eighth day, while the normal placentæ were quite firmly attached, and presumably would have remained so for two days longer, when full time would have been reached.

It is well known that it is often extremely difficult to induce abortion in the human subject, provided the ovum be healthy; and that in many cases nothing short of manual separation will serve. This is due to the close incorporation of fœtal and maternal structures, and to the fact that the "zone of separation," which in the human placenta may be regarded as the spongy layer of the decidua, has not sufficiently developed. In the rabbit's placenta we see the development of this zone much more clearly and definitely than in the human subject, and its accelerated development in cases where the fœtus is dead is very instructive, as showing that while there is a tendency to abortion, this cannot take place until a certain definite series of changes have occurred. What it is that determines the formation of the zone of separation in the placenta is not known, but these experiments show that it cannot be dependent in any way upon the vitality of the fœtus belonging to it. Indeed, one of the most remarkable results of the experiments has been the demonstration of how little the development of the maternal placenta is so dependent.

I would here, then, emphasise this fact, that the dead ovum and placenta are not cast off till certain definite developmental changes have been gone through, these changes being in every respect anolagous to those which determine the separation of the normal placenta.

Fig. 2 shows the zone of separation as seen by the naked eye,

and brings out the contrast between the normal and the punctured sacs; while Figs. 4 and 5 show the microscopic appearances.

What the changes in the placenta would be when the initial cause of its degeneration resided not in the fœtal, but in the maternal structures, I have not determined. It is conceivable that a large hæmorrhage, for instance, occurring close to the line of attachment to the uterine wall, would so tear up the tissues as to completely detach the placenta before the zone of separation had developed. Abortion in the human subject is sometimes due to such a cause, the ovum being at once expelled in a perfectly fresh condition, and with a fœtus which has the normal appearances that obtained at the period of pregnancy at which the abortion occurs.

On the other hand, it is common to find, on examining an abortion sac, that the placenta and decidua present appearances which differ little from normal, while the fœtus is in an advanced state of softening and disintegration, and has evidently been dead for some time. It has accordingly been inferred that such cases of abortion are due primarily to the death of the fœtus, and that the placenta has to a certain extent retained its vitality.

Referring to this subject, Ballantyne (6) in his "Antenatal Pathology," says: "It is possible that there may be a greater independence between the vitality of the fœtus and that of its annexa than has hitherto been supposed, and that when the cause of fœtal death resides in the fœtus itself, the life of the placenta may to a certain extent be continued. When, on the other hand, the fœtus dies because the placenta is practically dead, the dependence will be more manifest." These experiments, I think, bear out this opinion, for although no perfect analogy can be drawn between the placenta of the rabbit and that of the human subject, yet the broad general lines of their structure and development are essentially the same, and the degree of dependence of the fœtal on the maternal structures, and *vice versa*, must be identical, so that we are justified in regarding the sequence of events, as they occur in the rabbits' placenta following on the death of the fœtus, to be the same as those which occur in the human placenta under similar circumstances. This point of difference must, however, always be kept in mind in interpreting the pathology of the human

placenta in the light of that of the rabbit, viz., that in the rabbit the placenta of the dead fœtus shares in the augmented blood supply which the presence of the other sacs in the horn determines.

While the maternal part of the placenta thus maintains its vitality, it is otherwise with the fœtal portion, as the changes which it undergoes are mostly an expression of the death of the tissue. This death does not occur for a few days after the death of the fœtus, as after an interval of three days the ectoderm still retains its power of penetrating the maternal placenta. The first pathological change observed is a deposit of coagulated lymph in the mesoderm of the surface. This is the result of a slow leakage from the fœtal vessels. As the interval between the operation and the death of the mother lengthens, this fibrinous deposit in the mesoderm becomes denser and extends throughout the substance of the placenta, while the cellular elements degenerate.

The changes which the ectoderm undergoes are very characteristic. They are of slower occurrence than those in the mesoderm, as, after an interval of three days, as already mentioned, it still retains its vitality where it is in contact with maternal tissues. It must be from them that it derives its nourishment, as all circulation in the fœtal mesoderm must cease after the death of the fœtus. After a five days' interval degeneration is present, as evidenced by the granular cell protoplasm and faint or entirely absent nuclear staining. The degeneration is most marked in the central areas, and least so at the maternal junction, where many of the cells are in actual contact with maternal blood.

At intervals of seven, nine, and ten days, the degenerative changes progressively increase, so that the original structure of the fœtal placenta becomes gradually lost, the division into columns is no longer recognisable, and it assumes a dense, solid structure, in which no cell outlines can be distinguished. After twelve and fourteen days, the fibrinous deposit everywhere invades the ectoderm, so that the latter can only be recognised in patches (Figs. 6, 7, and 8).

It would thus appear that the ectoderm has very little power of independent growth in the rabbit's placenta during the middle and later stages of gestation, but that it is dependent

for its vitality on the fœtal blood carried by the vessels in the mesoderm. In none of the cases has there been detected any tendency to proliferation of the ectoderm, such as occurs in hydatid mole and deciduoma malignum in the human subject. Eden (8), in a number of retained human placentæ which he examined, never saw any proliferation of the epithelium of the villi, all of which bears out the contention that there must be something in addition to the death of the fœtus which determines the development of these conditions. Haultain (9), from the study of a case of deciduoma malignum, concludes that the epithelium of the villi continues to proliferate and penetrate the maternal tissues only so long as it is in contact with circulating blood, and that when coagulation and extravasation occur it rapidly degenerates. The fibrin deposit in the maternal placenta in my cases cannot, however, be regarded as contributing to the death of the ectoderm, as in the rabbits' placenta it is the fibrinous deposit round the maternal sinuses which allows of the penetration of the ectoderm, and in the punctured sacs there was evidence that the circulation in the material sinuses was going on.

The changes which Eden has described in the retained human placenta correspond very closely to those which I have found in the rabbit. He concludes that after the death of the fœtus the maternal circulation in the intervillous spaces continues actively for some time, but that gradually it becomes slowed in certain areas. The consequence is that the blood coagulates, and fibrin is deposited round the villi. This is a process which occurs normally in the human placenta, resulting in the formation of white infarcts. In the placenta of a dead fœtus this process goes very much further, so that the normal spongy consistency is lost and the placenta becomes extensively consolidated. The fibrinous deposit extends into the compact layer of the desidua, but the spongy layer (which may be regarded as analogous to the zone of separation in the rabbit's placenta) is never so invaded, but remains loose and easily separable. Fothergill (10) has described the first stages of connective tissue formation in the fibrin deposit, but Eden holds there is no such process, and in none of my cases in the rabbit has there been any. The villi ultimately lose their epithelial covering, so that the great majority are only recog-

nisable by their outlines, but in the spongy part of the placenta apparently healthy villi can be recognised for a long time.

While in the case of the human placenta it can only be an inference that all changes found in it occur after fœtal death, I have been able to prove definitely in my experiments that the changes described do so occur.

With regard to the liquor amnii, all that my observations definitely prove is that its secretion ceases with the death of the fœtus, and this in spite of the fact that the maternal part of the placenta shows very little departure from normal for the first few days after the withdrawal of the fluid. These facts would point towards the conclusion that in the rabbit the amniotic fluid is fœtal in origin.

Conclusions.

1. As a result of the withdrawal of the yolk sac fluid and liquor amnii the fœtus at once dies, death being due to arrest of the vitelline and allantoic circulation.

2. The dead fœtus and its placenta are retained *in utero*, and the former undergoes degenerative processes, and becomes flattened out.

3. The changes which occur in the two parts of the retained placenta, maternal and fœtal, are different in nature.

4. The fœtal part slowly degenerates, the mesoderm becoming invaded by fibrin, and the cells of the ectoderm undergoing a granular disintegration.

5. There is no tendency to proliferation of the ectoderm after fœtal death.

6. The changes in the maternal placenta do not differ in their essential nature from those that occur during its normal development.

7. The placenta becomes detached only when the tissue forming the zone of separation has become sufficiently attenuated, and it does so in the same manner as the normal placenta.

8. The secretion of the liquor amnii ceases on the death of the fœtus.

In conclusion, I would take this opportunity of expressing my best thanks to Dr A. H. F. Barbour and Dr D. Noël Paton or much encouragement and help during the course of the nvestigation.

Description of Plates.

Fig. 1.—Entire Uterus—removed post-mortem. Operation performed when animal was 14 days pregnant. Interval between operation and death of animal, 7 days. Note the contrast between the normal (N) and the punctured sacs (P). (S) is the site from which the sac was excised at operation.

Fig. 2.—Transverse Sections of Sacs of Uterus shown in Fig. 1. Operation at 14th day. Animal killed on 21st day. Interval, 7 days. (A) normal sac excised at operation—14 days pregnant. (B) normal sac removed post-mortem—21 days pregnant. (C) aspirated sac removed post-mortem—21 days pregnant. Note that the wall of the punctured sac is thickened, and the placenta compressed laterally, while the fœtus (f) is flattened out. The amniotic sac is obliterated. Note also the well-marked zone of separation in the aspirated sac (S).

Fig. 3.—Showing two Sacs from a Uterus. Operation at the 16th day. Animal killed on the 19th day. (A) normal sac removed post-mortem —19 days. The roof of the sac has been dissected off to show the relation of the fœtus in its membranes. (B) punctured sac. Note absence of liquor amnii, and fœtus lying flattened out on surface of placenta. (C) fœtus from a normal 19th day sac. (D) fœtus from a punctured sac which shows the development of a 16th day fœtus, and must therefore have died immediately after operation.

Fig. 4.—Part of Maternal Placenta from a normal 16th day sac (×50). Note that no zone of separation is yet differentiated.

Fig. 5.—Part of Maternal Placenta from a punctured sac. Operation at 15th day. Animal killed at 27th day (×50). Note the zone of separation (S) clearly differentiated from the rest of the placenta, which is extensively invaded by fibrin. (U) uterine wall.

Fig. 6.—Normal Fœtal Placenta at 16th day (×50). Note the subdivision of the ectoderm into columns by the mesoderm carrying the fœtal vessels. There is no fibrinous deposit.

Fig. 7.—Fœtal Placenta from sac aspirated on the 14th day, and removed post-mortem 5 days later (×50). The ectodermic columns are compressed and the cells degenerated. The mesoderm is invaded by fibrin.

Fig. 8.—Fœtal Placenta from sac aspirated on the 14th day, and removed post-mortem 7 days later (×50). The division into columns is not recognisable. The ectoderm is extensively degenerated, so that cell outlines cannot be recognised. There is an extensive invasion by fibrin.

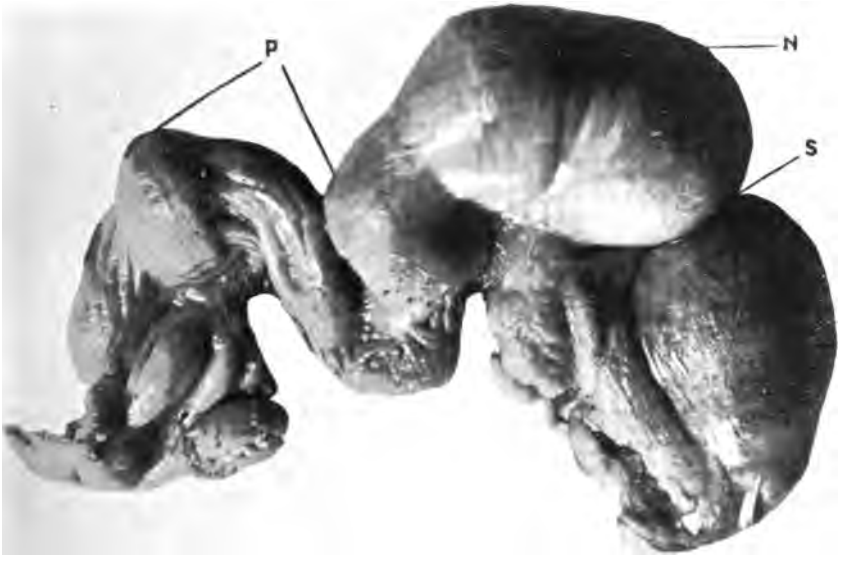

FIG. 1.

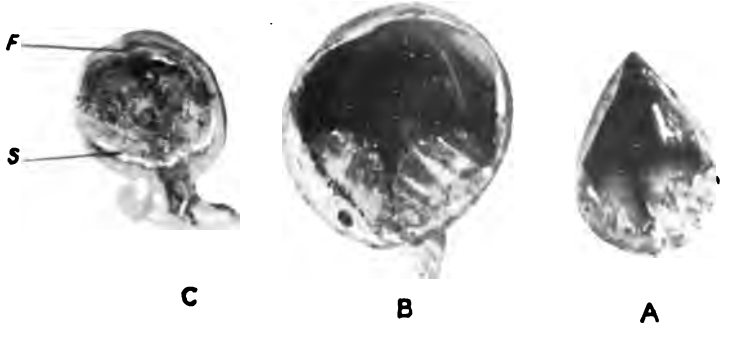

FIG. 2.

PLATE I.—TO ILLUSTRATE DR WATSON'S PAPER.

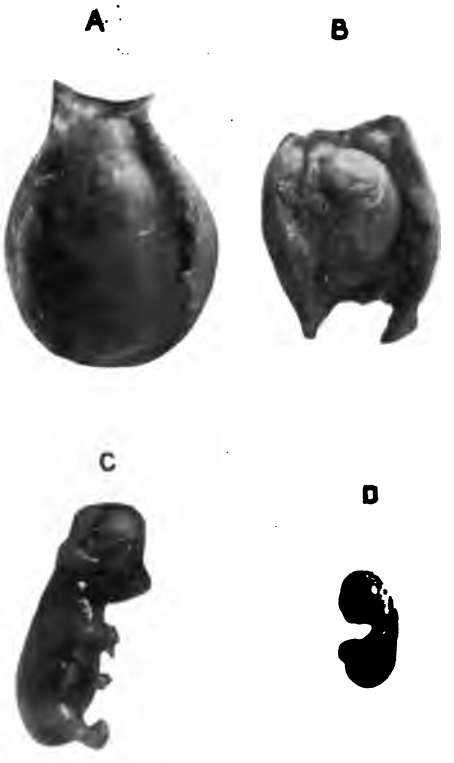

FIG. 3.

FIG. 4.

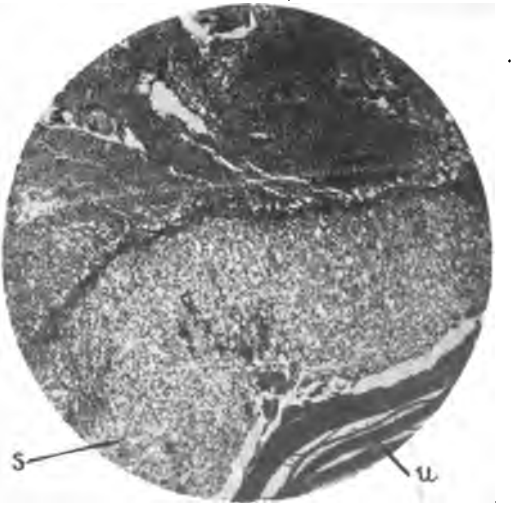

FIG. 5.

PLATE II.—TO ILLUSTRATE DR WATSON'S PAPER.

FIG. 6.

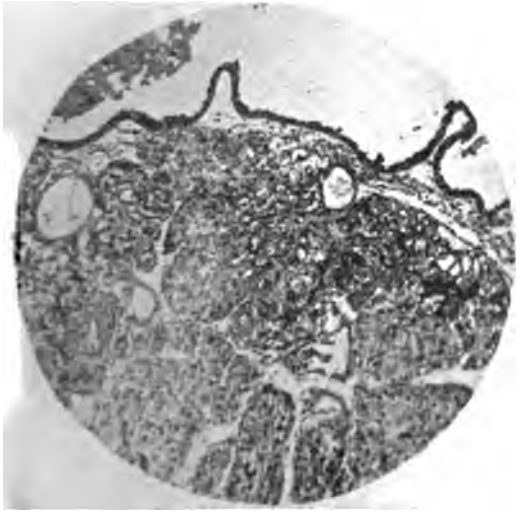

FIG. 7.

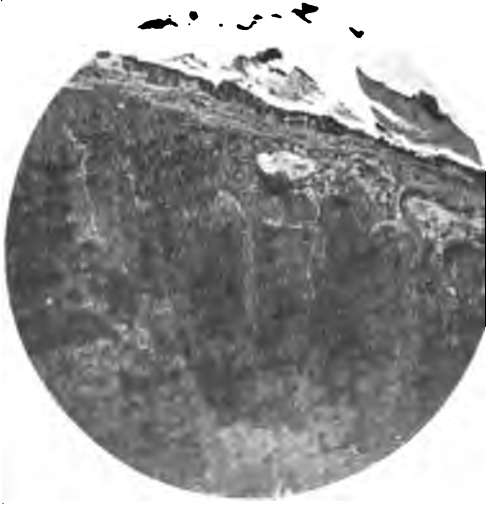

FIG. 8.

PLATE III.—TO ILLUSTRATE DR WATSON'S PAPER.

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PULMONARY TUBERCULOSIS: IN THE SANATORIUM AND AFTER

By DAVID H. STIRLING, M.D.,
Perth

IN a former communication (July 1904) you allowed me to make some general statements as to measures for prevention and treatment of Tuberculosis. The more strictly medical questions were hardly entered on. Since then our medical journals have teemed with papers, letters innumerable, some of great value, others one-sided and singular. Sanatoria have been ridiculed and overpraised. Notification of the disease has been urgently demanded.

Of treatment of early cases in a properly regulated sanatorium I can now speak very favourably. Of therapeutics as specifics I can say nothing. Symptoms have been treated, the larynx in all degrees of local change has been dealt with, due attention has been given to rest and exercise, troublesome conditions of the alimentary system attended to, teeth seen to; in a word, every care has been taken to improve general tone

and keep health at highest possible level. Without hesitation I affirm, as against all who write disparagingly of sanatoria, that only in quite exceptional cases could equal advantages be enjoyed under home treatment. As the work here is purely philanthropic, no selfish interest can affect the preference given to sanatorium over home treatment.

"Vaccine" or "serum" treatment has not been carried on hitherto; should this be resorted to in the near future, results and future history will be recorded carefully and comparison instituted. There is no temptation to advertise situation, climate, or other advantages, the one desire is to state what three and a half years' experience of full open-air treatment teach as to the curability of Pulmonary Tuberculosis.

A year has elapsed since the last of the cases referred to in this paper were under treatment. I prefer not to consider those treated since, as it is very important that future history of all cases should extend to a considerable period after discharge.

I have divided the cases under three heads: early, moderately advanced, and later stages. Without subdivision of this kind it is quite useless to speak of the curability or incurability of Pulmonary Tuberculosis. There are acute cases seen early that will run on, in spite of all open-air advantages, to rapid death, the system overwhelmed by a general toxæmia; these are exceptional. It is probable that such cases may prove fatal, spite of any vaccine or serum treatment that may yet be found of value as remedial agents, certainly they defy all other efforts to stay the plague.

Some cases not so acute have been sent to the sanatorium, and at once sent on to the house set apart for advanced cases. There open-air treatment is carried out also. A few of these followed at first the course of an acute pulmonary catarrh, so far as physical signs go, passing gradually into the ordinary form of chronic tuberculosis, with very varying degrees of local changes. Others died.

None such were admitted as "early cases," suitable for sanatorium treatment. They all required night nursing, and could not be other than disturbing to the really hopeful early cases.

In fairness to the estimate of value of early treatment,

seeing that a small proportion of possibly early cases have been refused, it must be said that a very large number of fairly advanced cases have been sent in and certified, some as "early," others as "suitable for sanatorium treatment." As far as possible these have been placed in the second subdivision, but some have found a place among cases of "early stage." It has not been easy to be absolutely sure of correct classification. Nor am I at all certain that other medical men would agree with the classification adopted; I only claim a careful selection of what were considered early cases, proved by all tests to be cases of Pulmonary Tuberculosis.

The period comprised in the tabulated statement extends from July 1901 to December 1904.

One hundred and eighty-four cases have been under treatment.

Of these, 54 are entered as "early stage."
" 60 " " "moderately advanced."
" 70 " " "advanced."

In the hope that space may be allowed, I venture to present what follows in some detail.

And first as to cases in early stage.

Age from 10 to 42 years. Heredity was admitted in 24.

Period of residence, from 1 to 7 months.

Result:—Well, 43; almost well, 6; much improved, 2; improving, 1.

Later history:—

Died, 1, 16 months after. Resumed work, drank heavily, conduct reckless.

Died 1, 3 years after, at Norval's Pont, South Africa—cause of death not stated.

One readmitted November 1905 (well 2½ years)—no T.B. found *now*.

Four, no late report.

Two in poor health.

One, relapse a few months after leaving. Condition serious.

Forty continue in good health, and engaged in ordinary duties.

Two doubtful.

Cases moderately advanced, 60 in all.

Age from 7 to 41 years. Heredity admitted in 25.

Period of residence, from 1 to 9 months.

Result:—Well, 10; improved, 16; much improved, 17; almost well, 10.

Unimproved, 6; died, 1.

No other deaths are recorded. Cases clearly going wrong are sent away, the sanatorium, strictly speaking, being arranged for early cases only, and accommodation for advanced cases is sadly limited. The later history, so far as any practical lesson may be learned from results, is the important consideration.

Later history:—

Twenty-two have died since discharge, some soon after, others some months.

Two or three survived from a year to 18 months after leaving.

Eight almost certainly dead, but cannot be traced.

Seven resumed work or home duties, not strong, the disease probably still rendering them a danger to others.

Nineteen have continued well, and doing full work.

Four cannot be traced.

The single death occurred very suddenly. A male convalescent, almost well, sat down outside on a cold afternoon without an overcoat, immediately after a walk on the hill; he was seized two hours later with great oppression of breathing, rapid bronchial effusion followed—death in 12 hours. The foolish exposure was contrary to strict rules, constantly enjoined. Inconceivable carelessness is not infrequent.

One case may be noted because clearly traced to infection.

Strong, well-built man, aged 26 years, never ill, asylum attendant in a large county asylum; much exposed to close contact with pulmonary and local tuberculosis; health failed, cough and other symptoms of chest affection appeared. On admission to the sanatorium, apex of one lung and scattered foci in the other were the local signs. Large expectoration, blood-stained, with abundant bacilli, cough troublesome, are noted. Recovery rapid and complete.

Advanced cases, 70 in all.

Age, 14 to 64 years. Heredity admitted in 31.

Period of residence, 3 days to 11 months.

Result:—Well, 1; almost well, 2; much improved, 10; improved, 17.

Unimproved, 38.

Two sent to house for advanced cases after examination.

No deaths are recorded; many were sent to "Cottage" or to their own homes as soon as arrangements could be made for transference, or return to care of friends. The later history is not surprising, but instructive:—

Twenty-nine died within 2 months after leaving.

Twenty-eight died within 18 months after leaving—most of them within 6 months.

Four survived for a longer period than 18 months, but never able to work.

Five were in poor health, unable to work, 2 years after; no late report—probably dead.

One continues well in health, with a large dry cavity in lower lobe of left lung.

One continues well and at work.

The last case possesses points of interest.

Very bad family history. Removed from small house where a brother had just died; general condition of home wretched. On admission "looks in fair health; has been a week in Cottage. Large, well-formed chest. Respirations very rapid; slightest exertion causes extreme difficulty of breathing. Cough very troublesome. Odour of body marked, a peculiar odour very common in pulmonary tuberculosis. Chest looks as if always fully expanded, but on full forced inspiration left side markedly impaired. Complete dullness on strong percussion over entire anterior and lateral areas same side. Sputa large quantity. T.B. abundant. Pulse 80 to 100 and 120. Temperature subnormal." Central focus of disease probably deep-seated. For some months this patient seemed a most unlikely one to recover, but as no sign of breaking down of lung appeared, she was continued as a case that might show what amount of recovery an advanced case with hopeful general condition might reach to under sanatorium treatment. Eventually everything went well. Bacilli disappeared, pulse slowed somewhat, 76 to 98; temperature, as had been nearly always, subnormal. I do not say this person has quite recovered, but should she continue quite well for another full year, any later attack might be more correctly called reinfection than relapse.

When discharged, percussion, auscultation, bacteriological examination, and general condition warranted one in considering the patient to have recovered.

In the "moderately advanced cases," many more would have recovered if sufficiently long residence had been allowed. As it was, 19 out of 60 have continued well, but only 10 were sufficiently recovered to be entered as such. Recovery had set in, and was going on towards convalescence in many, who could not possibly continue open-air treatment at home.

That a few very advanced cases do recover, twenty years' experience has clearly proved. From the Cottage, seemingly hopeless cases, after two, three, even four years' residence, have gone out recovered and continued well. The great want is accommodation and means of support for persons in sanatoria whose hope of recovery is in a lengthened course of treatment. These should be provided, for moderately advanced and later stages in separate homes. I refer only to persons whose circumstances require the aid of friends to obtain the requisite assistance.

Strenuous effort now, properly directed, would, in my opinion, secure proper treatment of early cases and prevent nearly all passing into later stages. Home treatment under any outside supervision whatever will never deal with this disease successfully in the houses of the poor. The education of the sanatorium does much to give sufferers a real love of fresh air by day and night; most valuable teachers of others they become; but a visit to the small house and the young family shows how impossible it is to help the "improved" or "almost well" forward to full recovery. Kindly visitors, tactful, intelligent enthusiasts in the crusade, are gladly welcomed helpers; but the homes, the environment, are too powerful factors in the spread of the terrible bacillus. Their help to discover early signs of the disease, and recommendation of immediate recourse to open-air treatment, would be as light in the darkness.

It may be asked, "Why are moderately-advanced and advanced cases admitted to a sanatorium specially arranged for early cases?" The answer is, because, first, medical men recommend them as "suitable for sanatorium treatment"; second, because most of them are almost sure to do well for

a time, and education in open-air treatment is of great value to at all events limit the danger of infection on return to their own homes; and third, because a few moderately-advanced cases, as has been shown, go on to recovery in the sanatorium, and a few, discharged as "much improved," continue to progress towards recovery afterwards, under careful home treatment in fairly suitable surroundings.

REMARKS ON SOME CLINICAL CONDITIONS: MOVABLE KIDNEY, PERMANENT INGUINAL COLOSTOMY, PSOAS ABSCESS, VACCINE TREATMENT[1]

By H. M. W. GRAY, M.B., F.R.C.S.,
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I PROPOSE in this communication to make some remarks about a miscellaneous selection of cases which have been prominent in my practice during the past few years.

I have been particularly struck by the number of cases of MOVABLE KIDNEY which have come under my care. You will find in the writings and teaching of modern authorities that there is an increasing disinclination to advise operative treatment because of the want of improvement which follows such interference. The want of success is attributed to various causes, such as the neurotic condition of the patient, or the fact that the movable kidney is so frequently part of a general enteroptosis, and that, therefore, one cannot expect to get benefit from the fixation of only one loose organ. With regard to the first reason, one has to be very careful in promising success in neurotic individuals, *if* one undertakes operation in them at all. All the same, I do not think that such cases should always be refused operative treatment. The knowledge that they have a movable organ, to which definite symptoms can be referred, acts in a deleterious way. In several of these neurotic cases, operation has done well; but the patient's

[1] Read before the Aberdeen Medico-Chirurgical Society, December 7, 1905.

general mental and bodily condition must be braced up as well by, *e.g.* a course of Weir-Mitchell treatment. Full benefit is not obtained sometimes till a year or eighteen months after treatment is instituted. In several cases of general enteroptosis, where the renal symptoms have been most prominent, nephropexy, with the use afterwards of so-called straight-fronted corsets, has brought about relief of symptoms. Many have said that movable kidney is due greatly to loss of fat about the kidney, and that if you can make the patient fat again you will cure the loose kidney. I do not believe that, and base my belief on the fact that many of the cases with markedly movable kidney have been possessed of an ample supply of fat around the kidney and elsewhere as well. On the other hand, patients with movable kidney often refuse to put on fat until the kidney has been satisfactorily fixed. Therefore it is that in certain neurotic cases (when the symptoms due to movable kidney are really prominent) I save time by operating first and letting the patient have the benefit of Weir-Mitchell treatment during and after convalescence, instead of trying the fattening process first.

With regard to the use of pads and belts to keep the kidney in place, Sir Frederick Treves and others have made strong statements in favour thereof. Cases, in series of fifties and even hundreds, have been made perfectly comfortable or cured entirely by their use! I think that the anatomy of the Southerner must account in some way for this brilliant success, because the same consistent results do not follow the use of such appliances in the North, although there are a few strikingly successful ones, while *partial* relief, no doubt, is procured in a good number. I do not think that faulty method of application is to blame. Anyhow, there is quite a large number of patients whose loose kidneys will not bear pad treatment, even after long rest in bed and careful reposition of the kidney before applying the pad. Again, in the ordinary type of hospital patient, I never hesitate to recommend operative treatment straight away, because the pad treatment demands an expenditure of, at all events, a certain amount of money and care, which such patients either cannot or will not afford. You will understand, of course, that only where symptoms are distinctly referable to the movable organ is operation advised

Dozens of cases turn up in a year's time with loose kidneys which do not cause any trouble whatever.

To my mind, treatment of movable kidney by artificial external support from below is on a par with treatment of hernia by trusses, which is, for many reasons which will also apply in the case of movable kidney, given up in favour of operative treatment whenever possible.

I believe that the great reason of want of success in the surgical treatment of such cases in this country is a faulty method of operating. No doubt there is more than one cause for a kidney becoming loose, and I do not believe that, once the kidney has become loose enough to cause symptoms, it will ever become safely fixed by any means short of operation. One cannot treat a movable kidney by removing the cause, and, therefore, any treatment is more or less a makeshift, which, of course, will not be successful in every case. There is no end to the number of clever operations which have been invented. In none of the British descriptions does one find notice of what I think is the essential procedure, viz. the removal of the peri-renal fat-bearing tissue between the kidney and the posterior abdominal wall. American surgeons have brought this prominently forward. Fibro-fatty material is sometimes used to prevent adhesions, *e.g.* in cases of operation for ankylosis. In the case of the kidney, it matters not how cleverly sutures are inserted into the kidney or fascia surrounding it, unless this peri-renal tissue is systematically removed—not pushed aside by chance during the insertion of sutures—there is great danger of recurrence. If it be cleared fortuitously from only one part, *e.g.* the lower pole, the other parts remain movable still, and, by swinging around the fixed part, may cause more intense symptoms than before operation. This actually happened in a case I had to operate on about two years ago, after nephropexy had been performed elsewhere some time previously. The lower pole of the kidney was firmly adherent to the abdominal wall, while the upper four-fifths, still surrounded by peri-renal fat, was quite loose, and, when the patient was erect, from time to time toppled over till the upper pole was directed towards the opposite iliac fossa, thereby kinking the ureter and twisting the renal vessels and causing very intense symptoms. Her symptoms were com-

pletely relieved by operation, and she has remained well since. I saw her a few weeks ago, when she was in the most vigorous health.[1]

I do not propose to weary you with a description of the technique of the operation which I perform in all such cases. I shall merely state that no sutures are used to moor the kidney. Strips of gauze (removed at the end of seven or eight days) are carefully laid around it, with the idea of exciting the formation of granulation, ultimately fibrous tissue, which binds the kidney on to the bared posterior abdominal wall. The patients are kept on their backs for three weeks altogether; during the fourth week they are allowed more freedom, and are sent home, or to the convalescent hospital, at the end of that time, with instructions to recline as much as possible for another fortnight, after which time they may return to their ordinary duties. Out of about forty cases, I have heard of only one in whom the kidney broke loose, and in that case there was most persistent vomiting during convalescence. That the patients appreciate the good results of the operation is evidenced by the fact that recently a patient came to the hospital to have her movable kidney fixed, whose sister eighteen months previously had this operation performed.

From time to time difficulty occurs in the diagnosis of renal trouble, to say whether the kidney alone is affected or whether the gall-bladder, appendix, and even ovary, are diseased also. In such cases, while performing nephropexy, I make a practice of incising the peritoneum along the outer side of the colon. This is a simple matter, and the hand may be introduced into the abdominal cavity, and can easily palpate the organs mentioned. By allowing the intestines to fall towards the dependent side, the gall-bladder and appendix will become *visible* in some cases. The appendix may be removed through this incision, if necessary, as I found in a case a short time ago. Before suturing the peritoneum, it is advisable to allow the patient to roll round nearly on the back, so that the intestines drive air out of the abdomen. It is almost unnecessary to remark that such exploration should be avoided when sepsis in the renal region exists, but I have incised the

[1] *Edin Med. Journ.*, September 1904.

peritoneum in this way, and sutured it securely before opening a septic kidney, without any bad result.

I should like now to refer to the operation of PERMANENT INGUINAL COLOSTOMY. Witzel, in 1894, initiated the principles of the operation which I shall describe. The advantages of this operation are not yet sufficiently appreciated, hence my excuse for bringing it before you. In a few cases it may not be applicable owing to shortness of the meso-sigmoid. The usual inguinal colostomy incision is made. The aponeurosis of the external oblique is divided in the long axis of its principal fibres. The fibres of the internal oblique and transversalis are separated as in the so-called gridiron incision; the peritoneum is opened, and the sigmoid flexure sought and drawn out, so as to find whether the meso-sigmoid is long enough to allow the apex of the sigmoid loop to easily reach a point 1½ inches below and internal to the anterior superior iliac spine. If so, then an incision about 1 inch in length is made at that point, parallel to Poupart's ligament, and the subcutaneous tissue is undermined by blunt or cutting force up to Poupart's ligament. Working now from the original wound, the aponeurosis of the external oblique is separated from the underlying internal oblique down to Poupart's ligament, and an incision, parallel to and immediately above that ligament, is made through it. A suitable forceps is now passed upwards through this tunnel from the second wound, and grasps the bowel at the apex of the sigmoid loop. The bowel is pulled down and fixed in the second wound by passing a Maydl's glass bar or similar instrument through the meso-sigmoid in the usual way. The upper wound is then sutured in layers, sutures being inserted, if necessary, to make the deeper layers lie snugly around the bowel. It is unnecessary to put stitches into the lower wound. I find that at the end of 24-48 hours there is no tendency for the sigmoid to retract when it is cut across. After a few days the bowel is trimmed flush with the skin. In none of my cases has there been any trouble from interference with the circulation of the bowel.

This operation can be done practically as quickly as the old operation. I think it is much more certain in preventing irregular escape of fæces from the bowel, and is therefore distinctly superior to it. To my mind it so disposes of the great

drawback of colostomy that one need not have by any means the same compunction as has hitherto existed about recommending the making of an artificial anus. One can see that a valvular opening is provided, and this is usually very efficient. In most cases the patient has but one movement of the bowels per diem, or can procure this by the injection of a little glycerine into the upper opening of the bowel. Usually only a small pad of dressing need be applied over the opening, on which a little mucus may collect. For hospital patients I recommend the wearing of an ordinary hernial truss with a *flat* pad, so modified that the pad presses lightly on the bowel as it passes over Poupart's ligament and the neighbouring firm tissues. In such cases there is, of course, the likelihood of more strain being put upon the valvular opening owing to the necessity for strenuous exertion. In some cases the closure is so efficient that the patients have to lift the pad of the truss before even flatus can escape. Seven of my cases were very satisfactory. The eighth did not live long enough to allow one to judge of the efficiency of the method. In one case the patient did hard work in the harvest field for three hours at a stretch without any inconvenience.

The treatment of PSOAS ABSCESS is the next subject I should like to consider. One must appreciate the physical characters of such an abscess before one can adequately treat it. The typical abscess arises from tuberculous disease of the bodies of some of the lower dorsal or upper lumbar vertebræ. It tracks downwards along the psoas and spreads itself out more or less in the iliac fossa. If it burrows further it then usually goes under Poupart's ligament and appears in the groin as a more or less rounded swelling. The abscess very frequently has small pieces of necrosed bone lying free in its interior, and the original focus of disease may still be active. In a certain number of cases, however, no such free or fixed diseased bone exists; the process, so far as the bone is concerned, being cured. The wall of the abscess, the so-called "pyogenic membrane," is still potent to perpetuate and increase the disease in the soft parts. This being so, the most certain method of obtaining cure is to remove, as far as possible, the diseased bone and lining membrane. This, I find, can be most easily and thoroughly done through a somewhat oblique incision

above the anterior half of the iliac crest. In children, it is sufficient to make it long enough to admit two fingers; while in adults, one which will allow the whole hand to be inserted is required. The cavity is then thoroughly explored to determine its limits and to ascertain if loose or fixed diseased bone is present. This incision gives better access to all parts of the abscess cavity, including diverticula, than does the site selected by Treves, namely, along the outer side of the erector spinæ. The pieces of diseased bone are removed, that from the bodies of the vertebræ by the help of sharp spoon or even chisel, if necessary. In children, it may be possible to squeeze out the pyogenic membrane; but frequently in them, and practically always in adults, the aid of the spoon has to be invoked at some part of the operation. The scraping should be done systematically and gently, but thoroughly. The spoon should be very large ($\frac{3}{4}$ in. × 1 in.), as this materially shortens and facilitates the procedure, besides making less liability to damage of important structures near, especially the thin anterior wall of the abscess. The cavity is now swabbed out carefully—the edges of the wound being fully retracted. I usually scrub the freshened walls with strong peroxide of hydrogen. I think that this has the effect of checking oozing. This action may be strengthened by the use of adrenalin solution. If the abscess has travelled below Poupart's ligament, it should be treated on exactly the same principles through a *free* incision so that all diverticula may be cleaned out. It is often quite easy, even in adults, to shell out the lining membrane, with the finger in this situation. Through and through interrupted sutures of catgut are inserted in the wound and held aside. The cavity is thoroughly dried; the walls are swabbed with iodoform emulsion, and the sutures tied rapidly. Dressings are applied and a large mass of cotton wool is placed on the front of the abdomen, corresponding with the area of the abscess cavity. A binder round the abdomen and a spica bandage on the upper part of the thigh are applied tightly. The elastic pressure of the big woollen abdominal pad tends to force the anterior abscess wall into contact with the posterior, and renders healing *per primam* more probable. Finally, a long splint is applied reaching from axilla to ankle, to prevent movement of the psoas. The dressing is

left undisturbed for three weeks. If the wound be looking unhealthy then, or if there be re-accumulation of fluid, the wound is excised and the cavity (usually very much less in extent and containing only yellowish-brown opaque fluid) is gently scraped out and treated as before. Flexion of the hip should be prevented for a month or six weeks after the cavity has apparently healed, and the patient kept in the recumbent position for some months longer. Perfect asepsis is essential to success. If the large cavity becomes infected, one knows what dire results are apt to follow. Our predecessors were, quite rightly, very chary about opening such abscesses. I believe, however, that even in infected cases where the bacterial growth is a multiple one, injection of vaccines of the various bacteria found in the discharge will greatly improve the chance of successful treatment. Of course the general health must be thoroughly looked after in the way usual in tuberculous cases, and injections of tuberculin should be given at proper intervals.

The treatment which I have mapped out furthers by several important details that carried out by many surgeons. Since I have practised it, I have had six cases with, so far as I can hear, but one unsuccessful result, in a child in whom I did not care to push vigorous measures as high into the thoracic region as the abscess cavity and diseased bone reached. A sinus formed and is still discharging a small amount of pus. She is now having injections of tuberculin R.

I consider aseptic incision and evidement superior to any other form of treatment which has hitherto been suggested. Aspiration, with or without subsequent injection of iodine or its compounds, must fail in a great number of cases because it does not remove the causes of the disease. It will probably succeed better when used along with tuberculin treatment, but even the latter will fail to remove pieces of bone in most cases. I should reserve aspiration, coupled with tuberculin treatment of course, for such enfeebled cases as will not likely stand the strain of operation.

There has been, in the medical papers recently, much writing about vaccine treatment, especially that applied to tuberculous disease. To Wright belongs the credit of developing this treatment, and of putting the dosage of the various vaccines,

as regards amount, frequency of repetition, and time of giving on a proper scientific basis. Perhaps, before showing you patients who have been subjected to the treatment, it may not be out of place to say a few words about the principles of the treatment, even though many of you may be conversant with the details of the writings alluded to.

Briefly described, the vaccine treatment of a disease consists of an injection into the patient of quantities of the dead organisms which produce the disease. The effect of this is to stimulate the production of certain protective substances in the blood, which enable the tissues to combat more successfully the living germs which have invaded them. First, one must clearly understand that the treatment is of *curative value* chiefly in cases where the disease is a localised one, although the local foci may be multiple. Its value can be only *prophylactic* in general infections, for which purpose it has been largely employed. It has been used where the general infection runs a very chronic course, *e.g.* Malta fever. In cases of more acute general infection, such as enteric fever, one will simply make matters worse by injecting such a vaccine during the course of the fever, as one is then but increasing the amount of poison which is already pervading the system, and which the resisting forces of the individual have not yet been able to overcome. The vaccine varies, of course, with the organism producing the disease. It is prepared in the following manner. A culture of the specific organism, best obtained, if possible, direct from the patient, is made. An emulsion of this culture is then made. The number of the germs in the emulsion is counted. The emulsion is standardised so that the number of organisms in a definite quantity is known. The emulsion is killed by raising it to a temperature of 60° C. for some time. (This temperature kills the organisms, but does not destroy the poisons which they produce.) Appropriate doses are then filled into sterile glass capsules, which are hermetically sealed.

When germs of disease are introduced into the body there is always a more or less successful effort made to neutralise their effect by the production of antibodies and by phagocytosis. When a vaccine is used the amount and character of this resistance varies to a certain extent with the dose

employed, but no good results follow from the employment of large doses, at any rate in the earlier stages. These antibodies may be divided roughly into those acting against the bacillus, and those acting against the poison produced by the bacillus. Wright ascribes to them five different characters —bactericidal substances, bacteriolytic substances, agglutinins, antitoxins, and opsonins. It is with the last of these that Wright has recently busied himself most. These opsonins seem to act on the appetite of the phagocyte for the corresponding bacteria, as piquant sauces act on the appetite of an alderman for his victuals. The bacteria are rendered more palatable, so that more are ingested.

In localised disease the amount of toxin absorbed from the focus into the blood-stream is apparently too small to stimulate the production of antibodies in efficient curative amount. At any rate, increased amount of antibodies in the serum, opsonins of course included, is brought about by the injection of a suitable dose of, say, staphylococcus vaccine, and increases the capacity of the phagocyte for enclosing these cocci.

The beneficial effect of the vaccine is, however, not immediate. After injection, there occurs a decrease in the amount of antibodies present in the blood, which characterises what Wright calls the "negative phase." After a few hours, or maybe a few days, the amount of antibodies increases, and usually rises above what it was before. This constitutes the "positive phase."[6] The increased resistance resulting from the greater amount of antibodies found during the height of the positive phase lasts for a period varying according to the different organisms. By injecting proper doses of vaccine at proper intervals the resistance of the individual is, in many cases, so much increased that the local disease is at last got rid of. The best time for injecting the repeated doses is when the acme of the positive phase is reached. The period of the negative phase must be avoided, because Wright found that when a second injection was made during this phase the resistance was still further decreased, so that harm is done. It is, therefore, necessary to have some reliable means of knowing when the phases occur, and when they are most pronounced. This is most conveniently done by estimating what is known as the opsonic power of the blood, and for the

sake of comparison and to conveniently record progress the results are registered as the opsonic index.

It may be a mistake to direct so much attention to the opsonic power of the blood, because there are other resisting forces at work, as already mentioned—the bactericidal, bacteriolytic, antitoxic, and agglutinative. These may also be made use of to indicate the resisting power, especially the agglutinating power of the serum. Whatever means of registering the resisting power of the patient are used, the results are the same, in that they show a negative phase immediately after the injection of vaccine, followed by a positive, in which the resisting power usually becomes greater than it was before. These phases are graphically represented as curves.[1]

If now, another dose of vaccine be injected at the acme of the positive phase, a negative phase occurs again which may, but frequently does not, go as low as the first negative phase, while the following positive phase goes higher than the first positive phase and so on. Tubercle vaccine acts apparently differently from other vaccines which have been investigated, in that one does not see the progressive cumulation in positive phases. In fact, Wright states, in his most recent communication on the subject, that he is guided in dosage by the degree of "negative phase" produced. If with each inoculation the negative phase phenomena are becoming more pronounced, he knows that too big a dose is being injected. "When, on the contrary, the negative phase phenomena are becoming, after each inoculation, less well marked, he knows that he is employing the proper dose and is making good progress." The estimation of the opsonic index is not an easy matter, in fact it requires highly skilled technique to produce reliable data. It is out of the question for an ordinarily busy man to carry out the observations. I do not think that the estimation of the opsonic index is *necessary* for successful treatment. Within fairly narrow limits as to time, one case will react like another, and one may be guided as to time of giving the doses of any vaccine by what has been found to occur in

[1] A curve, showing gradual increase in agglutinating power of the serum in a case of bacillus coli infection, was presented. At first agglutination only in dilution up to 1-10; after several inoculations, up to 1-300.

previously tested cases. Because of possible idiosyncrasy, one should always begin with a small dose, and bear in mind, if one increases the dose at all, that for success it is not necessary to produce a definite general reaction. In fact, speaking even from my own experience, I should say that a dose sufficient to provoke such a reaction is deleterious rather than beneficial. I should mention that Professor Wright says, in the communication already referred to, that he "regards it as a matter of great moment, especially in connection with immunisation against tubercle, to employ in every case the smallest doses which will elicit a satisfactory response." For practical purposes, if one cannot get the blood tested, a good working plan is to inject the dose of vaccine at intervals of nine to ten days. The positive phase has developed well by that time. In the case of tubercle, one should certainly not inject doses at shorter intervals than ten days, and if in doubt as to the progress of the case, the doses should be given at longer intervals still, say ten to fourteen days.[1] Wright tells me that one should incline to lengthen the intervals between the later doses. He very kindly sent me the doses which he is in the habit of using for treating the various localised pathological conditions produced by staphylococcus, streptococcus, gonococcus, bacillus coli, and tubercle bacillus :—

Staphylococcus, 500-1000 millions.
Streptococcus, 100-250 millions.
Gonococcus, 50-250 millions.
Bacillus coli, 100-1000 millions.
Tubercle bacillus, 1/2400-1/600 mgrm. of tuberculin powder.

From theoretical considerations, one would think that cure should be certain in every case of localised bacterial disease where the vaccine treatment is properly employed. In practice, however, this is found not to be the case, although improvement occurs in nearly all cases, for a time at least. Considering that such intricate metabolic processes are involved, it is not to be wondered at that, so to speak, misfires occur. Exercise, digestive processes, sleep, mental condition, climatic conditions, seem all to have their effect on this resisting power. One must

[1] This remark, founded on clinical experience, has scientific confirmation from the observations recorded by Lawson and Stewart, *Lancet*, Dec. 9, 1905.

remember that many of the lesions are due to mixed infections when treatment is being carried on, although they may have been uncomplicated to begin with. No doubt, the toxins, or even possibly the antibodies produced by the complicating organism, may interfere with the beneficial effect of the vaccine employed to overcome the organism first on the field. It is very noteworthy how an attack of influenza upsets the course of a cure. I have experienced this unfortunate development on several occasions.

I do not doubt also that the unequal results obtained in the vaccine treatment of pulmonary phthisis, or discharging tuberculous sinuses, of pyelitis and the like, are due to the fact that compound infections have occurred. Such cases should, to be rational, be treated with as many vaccines as there are varieties of organisms found in the discharge from the focus of disease. To use but one vaccine in such cases seems to me to be like the uprooting of a single kind of weed in a garden, under the expectation that all the other kinds of weed will die out spontaneously thereafter.

In conclusion, one may reiterate the practical application of vaccine treatment, which, after all, is the most important part for us. It must not be employed during the course of a general infective disease, unless, as stated, the disease is a very chronic one. In such disease it will probably prove of great prophylactic value when carried out on the lines indicated, viz. giving small repeated doses at proper intervals. This was not done, was not possible, in the antityphoid inoculation work carried on during the South African campaign, and hence the best results were not obtained. One dose of vaccine was administered then, usually on the voyage out, and in far too many cases the dose was too large, causing very serious and prolonged illness in some cases. There is no doubt, however, that this prophylactic treatment had, even under the circumstances, a fairly high protective value. G. L. Cheatle has recently advised vaccine treatment as a preventive of the septic pneumonia which is so apt to occur after severe operations on the upper respiratory tract. Before operation on two cases of cancer of the tongue, he injected the vaccines of staphylococcus aureus, and in one case also of pneumococcus. The operation is done, naturally, when the opsonic index is high. Of course it is absurd to

judge of possibilities from two cases, but it is noteworthy that in both cases there were no complications and the temperature remained normal.

The curative application of the vaccine treatment has a very wide field, which need not be further gone into now.

I should like to mention, finally, that the estimation of the opsonic power of the blood may be of use in diagnosis, especially, possibly, in cases of tuberculous disease, which is frequently so insidious. If the opsonic power be low against any suspected micro-organism, it is probably justifiable that the blame be attached to such organism, and that the proper vaccine treatment be instituted along with other more usual precautions.

It may be well to remark that tuberculin R, the latest form of tuberculin, "Koch's new tuberculin," is merely a modified bacterial vaccine.

Cases.

All the cases were examples of the effect of tuberculin R, given according to the above plan. The opsonic indices were not ascertained. Length of interval and amount of dose were decided by the effects on the clinical condition of the patient. In several cases of tuberculous disease with discharging sinuses, where the infection was a multiple one, only temporary improvement was noted. In none of the latter has cure occurred so far (5-6 months in some). The dose used was usually $\frac{1}{1000}$–$\frac{1}{100}$ mgrm.

CASE I. Young female. Extensive tuberculous disease of cervical glands. On many occasions, during past few years, glands were scraped, excision done also on left side 18 months before I first saw her in October 1905. Numerous glands then felt in anterior triangles on both sides and in lower part of posterior triangle on left. Sizes—from small bean to pigeon's egg. Consistence—varying—none definitely fluctuating. On right side, the recess between the submaxillary and carotid triangles was obliterated by a large bulging mass —like a fist—nodular, as if made up of enlarged glands matted together, with isolated glands round periphery. She

was anæmic; had lost flesh and strength; was irritable and despondent about her condition; appetite and digestion poor. To make certain of diagnosis, a small gland was excised and found to be tuberculous.

In all, 7 injections were given. Very decided improvement. The mass on the right side causes now but little projection, and the glands are isolated, no matting. All glands reduced to half or one-third of previous size. Some are very hard, doubtful if not due to calcification, and if that be so, excision will probably be wise. A very marked difference in mental condition—now bright, cheerful, and very hopeful about herself. Appetite and digestion excellent.

CASE II. Boy of 9. Tuberculous arthritis of right knee, beginning 2 years ago in internal condyle. Seen 18 months ago, when internal condyle much enlarged, tender, synovial membrane thickened, slight effusion into joint. Limp on walking and pain on movement of joint. History since—plaster of paris for 3 months, no improvement. Incision of internal condyle and evidement of focus in it—plaster for 6 months thereafter. Much improved, but still enlarged condyle and slight thickening of synovia. Improvement continued, and ultimately back to school. Four months ago injury to knee, followed by rapid deterioration. Condyle enlarged again markedly, synovial membrane swelled up, and effusion into joint was considerable—sinus formed at scar of operation and discharged thin purulent material. Pain and limp returned worse than ever. Flexion and extension limited to about ten degrees.

After 7 injections the knee is practically normal (sinus healed after first injection), save that flexion is limited to a right angle. Perhaps there is very slight enlargement of the condyle. Here again the general and mental condition improved markedly. Appetite, previously poor, now excellent. Has returned to school.

CASE III. A veritable tuberculous outcast, a child from the poorhouse, apathetic and miserable in mind and body. He had very bad tuberculous cervical glands on both sides, some suppurating, some with discharging sinuses. The skin was

also diseased, ulcerated, and undermined in parts. His right elbow-joint, the metacarpal bone of the left index finger, the left wrist and the left ankle-joint were all very much disintegrated by the disease. The various foci were scraped out. The condition of the ankle and elbow was such as to provoke the remark that amputations were probable in the near future. Yeast was given, half a teaspoonful in milk thrice daily, and 3 injections of tuberculin R. He was shown 37 days after the operation with all the foci practically healed. The condition of the neck was worst—the diseased skin being evidently most resistant to the treatment. He is a bright and intelligent child now compared with what he was.

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Judging from my own experience of, at any rate, purely tuberculous lesions, I should say that the prognosis in such cases must be marvellously brighter when tuberculin treatment is carried out along the lines laid down by Wright. After cure is effected, it will be advisable to carry out the injections for about a month in say every 6 or 12 months. This will prevent any tendency to recurrence or formation of fresh foci. After a few years the treatment could probably be discontinued.

Births and Deaths registered in Eight of the Principal Towns of Scotland during November 1905

DURING the month of November 1905 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth the births of 3758 living children. Of these, 1910 were male, and 1848 female. This number of births is equivalent to an annual birth-rate of 26.1 per thousand of the estimated population of these towns, a rate which is 1 per thousand less than that for the previous month, and also 1 per thousand less than that for November 1904. The birth-rate for the month was highest in Glasgow, 29.3, and lowest in Perth, 14.6. In Greenock it was 28.6; in Leith, 26.4; in Paisley, 25.9; in Aberdeen, 25.7; in Dundee, 24.3; and in Edinburgh, 20.5.

Of the 3758 births registered in these towns during the month, 264, or 7.0 per cent., were illegitimate. This illegitimate rate ranged from 12.5 per cent. in Dundee, to 1.1 per cent. in Paisley. In Aberdeen it was 10.2; in Edinburgh, 8.1; in Perth, 7.3; in Glasgow, 6.1; in Greenock, 5.5; and in Leith, 4.5.

Deaths registered during the month numbered 2706. Of these 1307 were of males, and 1399 of females. This number of deaths is equivalent to an annual death-rate of 18.8 per thousand, a rate which is 2.1 higher than that of October, and 0.4 higher than that for November 1904. The death-rate for the month ranged from 26.2 in Greenock, to 12.1 in Perth. In Dundee it was 22.2; in Glasgow, 20.2; in Edinburgh, 16.2; in Paisley, 15.8; in Aberdeen, 15.5; and in Leith, 15.4.

Of the 2706 deaths recorded during the month, 981, or 36.3 per cent., were of children of less than five years old, and 691, or 25.5 per cent., were of persons of over sixty. The former are 150 more than in the previous month, but 79 fewer than in the corresponding month of the previous year; the latter are 36 more than in the previous month, and 75 more than in the corresponding month of the previous year.

Deaths of children less than one year old numbered 592, a number equivalent to an infantile mortality of 145 per thousand births. This infantile mortality-rate is 20 more than that of October, but 19 less than that of November 1904. The infantile mortality-rate for the month was highest in Greenock, 157, and lowest in Perth, 45. In Dundee it was 156; in Glasgow, 154; in Edinburgh, 144; in Aberdeen, 142; in Leith, 129; and in Paisley, 85.

The seven principal epidemic diseases were the cause of 248 deaths in these towns during the month, the equivalent death-rate being 1.7 per thousand, a rate which is 0.3 above that for the previous month, and the same amount above that for the corresponding month of the previous year. The death-rate from these causes for the month ranged from 6.4 in Greenock, to 0.4 in Aberdeen and Perth. In Dundee this rate was 3.5 per thousand; in Glasgow, 1.9; in Leith, 1.0; in Paisley, 0.9; and in Edinburgh, 0.7.

There were no deaths registered in these towns as due to small-pox. Deaths ascribed to measles numbered 148, which is 85 more than in October, and 113 more than in November 1904. Deaths ascribed to scarlet fever numbered 10; to enteric fever, 5; and to typhus fever, 2. Deaths from diphtheria numbered 24, which is 4 fewer than in the previous month, but 1 more than in the corresponding month of last year. Deaths from whooping-cough numbered 24, which is 11 fewer than in the previous month, and 69 fewer than in November 1904. Deaths from diarrhœas numbered 35; these are 19 fewer than in the previous month, and 3 fewer than in the corresponding month of last year.

Deaths from influenza numbered 26; from puerperal septic conditions, 9; from diseases of the heart, 272; from apoplexies,

115; from premature birth debility, 79; and from alcoholism, 5. Deaths ascribed to malignant disease numbered 137; of them, 70 were attributed to carcinoma, 7 to sarcoma, and 60 to cancer not otherwise defined.

Deaths from pneumonia numbered 309, and constituted 11.4 per cent. of the total deaths; those from bronchitis numbered 250, and constituted 9.2 per cent. of the total; while those from phthisis numbered 210, and constituted 7.8 per cent. of the total. Deaths from pneumonia were 61 more than in October, but 70 fewer than in November 1904; those from bronchitis were 75 more than in October, but 46 fewer than in November 1904; and those from phthisis were 7 more than in October, but 6 fewer than in November 1904.

Meetings of Societies

Edinburgh Medico-Chirurgical Society

THE second ordinary meeting was held on December 6, 1905—the President, Dr J. O. Affleck, in the chair.

Dr W. T. Ritchie gave a microscopic demonstration of micrococcus catarrhalis from a case of bronchitis.

Drs Bruce, M'Donald, and Pirie showed microscopic preparations and photographs of a localised doubling of the spinal cord.

Mr Cathcart showed specimens of miliary tuberculosis in several organs, excited by an injury and secondary to tuberculosis of the kidney.

Mr E. S. Carmichael showed a specimen of tuberculous stricture of the ileum and disease of the cæcum and ileo-cæcal glands, and a vesical calculus removed from a boy æt. 3 years.

Mr Wallace exhibited two prostates removed by the suprapubic route, and a malignant tumour of the descending colon.

Mr Caird showed a specimen illustrating an intracranial abscess which was not discovered by exploratory operation.

Mr Alexis Thomson showed a tuberculous kidney which had been removed by the lumbar route, and which had secreted no indigo-carmine, and had allowed of functional diagnosis both with the cystoscope and separator.

Dr A. N. S. Carmichael exhibited a specimen of urine from a case of black-water fever which proved fatal after 48 hours' illness.

Mr Cathcart showed a patient after treatment for congenital

dislocation of the hip, and a case of patella twice sutured for fracture.

Dr Byrom Bramwell showed a case of multiple lipomata, in which the condition seemed to be hereditary, and a case of ataxia without any apparent impairment of the sense of movement (muscular sense).

Mr E. S. Carmichael showed a child, æt. 14 months, after resection of cæcum, ascending colon, four inches of small intestine, and masses of ileo-cæcal glands for tuberculous disease.

Mr Alexis Thomson showed a case exhibiting recurrent dislocation of the patellæ after MacEwan's operation for double knock-knee.

Mr David Wallace exhibited two patients after prostatectomy by the supra-pubic route.

Mr Caird showed: (1) a patient after recovery from tetanus; (2) a patient who had been under treatment in rapid succession for coxa vara, two attacks of appendicitis, and perforated duodenal ulcer; (3) a patient after recovery from perforating gastric ulcer. This case was one of a group of three patients in whom the operation had been followed by pleurisy and empyema.

Dr Aitchison Robertson gave a demonstration of the Uhlenbluth serum test for the recognition of human blood.

Mr Geo. G. Hamilton, Liverpool, read a paper on the treatment of Fractured Patella by Transverse Wiring. The paper was illustrated by a lantern demonstration of radiographs and the exhibition of cases.

Mr Hamilton said that four years ago he had spoken against the open method on account of its dangers, but experience in knee-joint operations for other conditions had led him to believe now that the open method was safe and was the quickest and best method for the working man. There could be no doubt about the open operation being the best if there were no chance of suppuration, but even one disaster in one hundred cases must lead to a reconsideration of the method. Mr Hamilton recommended a few days' delay for preparation of the skin, and the use of a preparation of barium sulphide for very hairy or dirty skins and in all emergencies. He made a small transverse incision over the upper end of the lower fragment, taking care to preserve the para-patellar ligaments, and used a mechanical drill in wiring the fragments. Mr Hamilton emphasised the great advantage of getting out all the blood, and the benefit of the transverse wire in pressing all the parts together and preventing further bleeding.

Mr Cathcart agreed in the main with Mr Hamilton's con-

tentions. Mr Caird said it required great courage to open the knee-joint in cold blood, and he could not lay claim to 100 per cent. of successes.

Mr Alexis Thomson said he had seen good results from Wharton Hood's method of simply strapping the thigh and letting the patient walk. No method could be adopted as a matter of routine, but wiring had the great advantage of a rapid convalescence.

Dr William Russell read a paper on the relation of Angina Pectoris and allied conditions to a Vasculo-cardiac Reflex having its origin in the abdomen. This reflex consists of an arterial constriction, balancing the hyperæmia of the abdominal vessels during digestion. This reflex constriction is unduly increased by high feeding and drinking, and may be successfully treated by a suitable dietary. Sclerosed vessels are specially sensitive to this reflex constriction, and even in cases where calcareous coronary arteries could not contract their branches might be specially sensitive. Dr Russell claimed that all the conflicting views regarding angina might be explained by his hypothesis.

Edinburgh Obstetrical Society

THE second ordinary meeting of this Society was held on the 13th December—Dr J. W. Ballantyne, President, in the chair.

Dr N. T. Brewis demonstrated numerous specimens, amongst the most interesting of which were an intra-ligamentary fibroid tumour removed along with a pregnant uterus at the fourth month; an ovarian tumour with twisted pedicle removed during pregnancy; and a solid ovarian tumour.

Dr Haig Ferguson showed a gangrenous cervical fibroid; Dr Lamond Lackie, a uterus which he had removed by vaginal hysterectomy for hæmorrhage.

The President showed a most interesting copy of Raynalde's "Byrthe of Mankynde" (edition of 1560); a partially flattened fœtus, not a twin, and a hydrocephalic infant.

Dr Barbour Simpson read a paper on "Pudendal Myxoma." He said that though tumours such as gummata, lipomata, fibromata, and carcinomata were not infrequently met with in this situation, it was rare to meet with a growth of a fully myxomatous type. The case he described was briefly as follows:—The patient, a Jewess, aged sixteen, complained of a growth in the privates, accompanied by bleeding. It had first appeared

three years previously, and gradually became larger and pedunculated, and latterly interfered with locomotion. The surface of the tumour became excoriated, and bleeding set in, usually at intervals of a week. On examination the tumour was 4 inches in length and 4 inches in breadth, and was suspended by a stalk 1½ inches broad, which grew from the right labium majus. The surface was smooth above, but excoriated and fungating below, and the stalk pulsated. The operation consisted of clamping the pedicle near its base and dividing it. The larger vessels were ligatured with catgut, and all bleeding points secured. The raw surfaces were united by a continuous catgut suture and a gauze dressing was applied. On inspection the growth was covered with skin epithelium, and was distinctly lobulated. The swollen papillae beneath had the appearance of sago grains. The growth was firm and elastic to the touch, and was filled with firm gelatinous material. On section the tumour was mostly composed of a clear gelatinous material, running through which were well-formed fibrous tissue strands. The jelly-like material was most abundant at the centre, but also ran out to the epithelium and distended it. Blood-vessels were seen in certain parts of the gelatinous substance. Microscopically the tumour was seen to be a myxoma with typical branching cells, the processes of which ramified in the mucoid substance. Young embryonic blood-vessels were seen in parts. Many of the papillæ were greatly distended and deformed, due to changes in the stroma which was undergoing œdematous infiltration and myxomatous degeneration. Many of the arteries showed thickening of their walls, and the veins were prominent and distended with blood. The lymphatics were numerous, and many mono-nucleated cells were seen lying in the subcutaneous tissue. The stalk was made up of the usual elements and arrangement of the skin hypertrophied. Running through two-thirds of its length at the centre was a mass of myxomatous tissue. Dr Simpson then enumerated the various types of myxomata, and said that while not infrequently met with in the mamma, salivary glands, and testicle, it was extremely rare to find it having its seat in the female pudenda. Three previously recorded cases were narrated. The communication was discussed by Drs Ballantyne, Angus Macdonald, Scott Carmichael, M. Campbell, and Berry Hart.

The President then read a paper on "The Delivery of the Hydrocephalic Fœtus by Spinal Tapping." He said that a year ago he had described a case where he delivered the infant by spinal tapping, having opened the spinal canal in the dorsal region and having passed a metal catheter into the cranial cavity. Recently he had repeated this procedure in a similar case, and

on account of its rarity recorded it. The patient was a multipara (iv-para), and had not felt well during her present pregnancy, but reached full term. On the evening of 27th November 1905 the membranes burst. At 9.30 P.M. slight pains came on, and became severe at 11.30 P.M. The pains, however, went upwards towards the chest instead of downwards, and seemed almost to be anti-peristaltic. On examination, the abdomen was greatly distended, but nothing like the head was palpable. The breech of a female infant was at the vulva, and the infant's back lay to the front. The feet and legs were drawn down, and with greater difficulty the arms were dragged through the brim, which showed a moderate degree of contraction. A ruptured spina bifida was noticed in the lumbar region of the child's back. From this fact, from the former history of the birth of an anencephalic fœtus, and from the large size and peculiar feeling of the uterus, Dr Ballantyne concluded that the case was one of hydrocephalus with the head lying above the brim. It would have been very difficult to perforate the fœtal head, as the pelvic brim was narrow and the head quite above it. The easier and safer method was to pass a silver catheter through the opening into the spinal canal already present, and so to the cranial cavity. When Dr Ballantyne felt the tip lying free in the cavity, he moved it about in various directions to make sure of reaching all parts of the hydrocephalic sac. The head collapsed easily, and when the water ceased to flow, traction was made on the trunk. On account of the narrow pelvis, some difficulty was experienced in drawing the collapsed head through the brim, but this was soon overcome. The infant weighed more than 10 lbs. after the head had been redistended with waer, and the circumference of the head in the occipito-frontal plane was 23 inches.

The patient's previous obstetric history was interesting. She first became pregnant when 36 years of age. Her first child was dead-born and premature. Her second pregnancy was accompanied by persistent vomiting. Labour came on at the seventh month, and she had suffered from marked hydramnios—about 2½ gallons of fluid escaping. The fœtus was anencephalic, and the diaphragm was awanting. Her third pregnancy and labour were normal, though the head was in the occipito-posterior position, and the child was alive and well.

Dr Ballantyne then referred to the infrequency of monster births, but alluded to the tendency to recurrent monstrosity in the same patient. Numerous instances occurred of two or three anencephalic fœtuses being born to the same mother. The most marked example Dr Ballantyne knew was that of a healthy woman, well formed, but for the absence of certain muscles of

her thumbs, an anomaly which she had in common with her mother and a sister. Her first two children were boys and healthy; the third pregnancy ended in abortion; the fourth resulted in the birth of a hydrocephalic female infant with absence of the right thumb and radius; the fifth child, a female, was alive and well; the sixth was a post-mature, dead-born, anencephalic female fœtus with other malformations, including the thumb; the seventh was a congenitally weak female infant who lived for six weeks; the eighth was also a premature female infant with early hydrocephalus, absence of both radii and right thumb, and malformed left thumb. The sex preference for recurrent monstrosity was alluded to.

In conclusion, Dr Ballantyne stated that when a woman had given birth to a malformed fœtus, it was very likely that she would do so again. Again, it must be concluded that a monstrosity tended to recur in the same or in an allied form.

The communication was discussed by Drs Barbour, James Ritchie, Haig Ferguson, Oliphant Nicholson, Barbour Simpson, and Thomas Wood.

The Glasgow Medico-Chirurgical Society

THE fourth ordinary meeting was held on November 17—the President, Dr Lindsay Steven, in the chair. There was a good attendance of members.

1. Dr Walker Downie showed: (*a*) A man on whom he had performed œsophagotomy for an impacted tooth-plate. The patient came to hospital on May 18, stating that the previous night he had wakened with sharp pain and breathlessness, and realised he had swallowed a plate that carried four incisors and was furnished with two projecting pins. Futile attempts at removal had been made. The site of impaction was a little above the cricoid, and the coin-catcher could not lift the plate, nor could it be seen with Killian's œsophagoscope. An X-ray plate was negative. Next day chloroform was administered and the gullet exposed by a 3½ in. incision. A corner of the plate almost projected through, owing to sloughing of the wall. At this point extraction was done. The object consisted of a vulcanite plate 1½ in. by 1 in. The wound was packed with iodoform gauze, and a tube passed by the nose to the stomach for feeding purposes. Three days later it was removed. A fistula persisted at the wound for about a month, and a little food came through at each meal. To cleanse, a hot solution of boracic was sipped after eating. Recovery was soon complete.

(*b*) The second case shown was that of a man operated on

this year for bilateral sarcoma of the tonsils. He came to hospital thin and haggard, complaining of sore throat. The tonsils were very large, uniform, and of dark red colour. Enlarged glands existed on both sides of the lower jaw. The left tonsil was excised first, the finger nail being used chiefly; it was found friable; there was little bleeding. The glands were excised next, and lastly, the right tonsil. Healing was good, and there has been gain in weight. The tonsils and glands showed the structure of a small-celled sarcoma with scanty stroma. The case was discussed by Drs Howie, Albert Gray, Alfred Young, and Sime, and several of the speakers spoke on the bilateral condition of the disease and the presence of enlarged glands. Dr Downie, replying, said that he had had four cases of bilateral sarcoma of the tonsils, and one case only of unilateral disease.

2. Dr Albert Gray described some pathological conditions in the inner ear, illustrating his remarks by beautiful lantern slides prepared from his own specimens. These specimens, on account of their minute size and fragile nature, require months of patient and skilful preparation, and the results obtained were very satisfactory. Dr Gray said that there was some hope that by a study of the pathological changes in the semi-circular canals, the ampular and other parts of the inner ear, some light might be thrown on the cause of such conditions as Menière's disease, tinnitus, and so forth. Yet in some cases little was found, and in one at least extensive purulent infiltration was associated with no symptoms. Dr Thomas Barr congratulated Dr Gray on the beautiful specimens he had been able to prepare, and said that in his experience more symptoms accompanied irritation of the inner ear than actual gross lesion there.

3. Dr W. W. Christie read a short paper on the use of stovaine as a local anæsthetic in throat and ear work. Chemically it was the chlorhydrate of ammonine, and was soluble in water, standing boiling readily. He had seen it used a good deal in Germany last summer in nose, throat, and dental work, and Dr Downie had allowed him to try it at the Western Infirmary. In all, 63 cases had been tried with it. A 5 per cent. solution was tried in 5 cases, and a 20 per cent. one in 58. Adrenalin was tried with it in a number of cases, but had little special effect. It showed no toxicity and produced anæsthesia more quickly than cocaine, but the effect was more transient. In 19 out of 21 cases where nasal cautery was performed no pain was felt; in 22 out of 26 cases for the cold snare there was complete anæsthesia, and a similar result was got for 5 out of 6 cases for snare and cautery combined. It had no effect on the vascularity of the part. A special feature,

rather against the drug, was that after application to the patient, the breath from the latter acquired a disagreeable odour. In cost (in actual work) the drug was 50 per cent. cheaper than cocaine. The paper was discussed by Drs Barr, Downie, Douglas, Gray, and others, and Dr Christie replied.

THE fifth ordinary meeting was held on December 1—the Vice-President, Dr Downie, in the chair. There was a large attendance of fellows.

1. Dr W. F. Somerville read a short note on a case of exophthalmic goitre in a male successfully treated. The patient was 46 years of age, and had had a cardiac murmur for fifteen years. In 1902, tremors began, and in 1903, the eyes were prominent. When he came under the speaker's care in autumn of 1905, his condition was as follows: The eyes were prominent and von Graefe's sign was present; the right pupil was larger than the left; the thyroid was enlarged, especially the right lobe, and general tremor existed, particularly on the right side of the body. The pulse was 116, there was an aortic cystolic bruit, the skin was moist and felt hot. Severe diarrhœa existed, and the knee-jerks were exaggerated. There was slight want of mental acuteness, the "chorea of ideas," to use Russell-Reynolds' phrase. The urine was 116 oz. on admission to the Home, with urea 558 grs., and uric acid 36 grs., a ratio of 15:1. Treatment consisted of five weeks of rest and isolation, good feeding, massage over the præcordia, with thyroidectin internally followed by strophanthus. The constant current was used also, the positive pole over the thyroid, the negative at the back of the neck. In twenty-six days the patient gained 17 lbs., the pulse fell to 60, the thyroid diminished, the eye-ball receded, and the knee-jerks became normal. On October 23, the urine was 60 oz., and urea 448 grs., with uric acid 17 grs. (26:1). The patient left the Home very well, and continues to keep so. Drs John Cowan and Carstairs Douglas spoke on this case.

2. Dr Alex. M'Lennan gave a short account of the spirochœta pallida, and showed, with Dr Teacher, stained and also living specimens. The work on this spirochœte had been done chiefly by Schandinn and Hoffmann, and the chief difficulty lay in the staining of the organism. To make films one simply scraped off the pus from a specific sore, stopped the bleeding, and made films from the serum. Giemsa's stain (methylene-azure blue and eosin) was generally used, 24 hours' action being required. He had got good results from a stain with saturated alcoholic gentian-violet (1 part), and 5 per cent. carbolic acid (9 parts). The stain was applied hot for several hours. The organism was a very fine spiral, being practically

length without breadth. It was the smallest spirochœte known so far. Each end was pointed, and the undulations were definite and sharp. Schandinn regarded it as a flagellated sporozoon, and had described a flagellum at each end. The organism likest to it was the S. refringens. Dr Teacher, who had mounted some of the specimens, said that he had got the spirochœte in each of three cases of chancre. In normal saline solution the movements could be seen well; the refringens was blunter and broader, and when it died, straightened itself out, while the pallida retained its spirals.

Professor Muir said the subject was one of great interest, and more work was still required to identify the various members of this group. That there were many, there was no doubt. Schandinn had described a spirochœte in the owl which had attained the size of a trypanosoma, and it was known that the Leishman-Donovan body in artificial cultures might develop into spirochœtes.

3. Dr D. M. Paton read a paper on the use of sera, inquiring whether we really got the good of them that we ought. He said he had attacked this matter from the standpoint of a general practitioner who was struck by the slight progress in sero-therapeutics made in the last decade. The problem was how to transfer the immunity from an immunised animal to man, and he did not believe it could readily be done by the usual means. He regarded the defence of the organism from bacterial and toxic infection as being twofold: (1) the lymphatic bactericidal, and anti-toxic; and (2) the systemic and anti-protiolytic. He had his first experiences in this field when some seven years ago he used diphtheria anti-toxin in scale form in pills, for oral administration in a case of phlegmonous cellulitis, and one of puerperal sepsis, both cases improving immediately. He continued using this serum by the mouth, and said he believed he had employed 20,000,000 units. But after a time he began to think that plain serum might do as well, and found that was so, the serum stimulating each organ, he believed, to produce its own defensive substances. Where an animal was naturally immune to a disease or very resistant, that animal's serum should be used for that disease. For instançe, the cow suffered readily from tuberculosis but rarely from influenza; the converse was true of the horse and sheep. Accordingly he would use horse-serum for phthisis, and cow- or ox-serum for influenza. Dr Paton then gave numerous instances illustrating the effects of sera given by mouth, upon the various febrile conditions due to staphylococcic and other infections. Professor Muir, Dr Eben. Duncan, and others discussed this paper, and Dr Paton replied.

THE sixth ordinary meeting was held on December 15—the President, Dr Lindsay Steven, in the chair.

1. Dr Jas. H. Nicoll showed a further series of cases of infants operated on for congenital stenosis of the pylorus, due to hypertrophy of the muscular fibres of the region, obstructing partly through mechanical bulk, partly through the redundant mucosa which this hypertrophy caused to be thrown into folds. The stomach hypertrophied, but did not dilate till late; the bowel was collapsed. The etiology was doubtful, the most likely being that suggested by Dr John Thomson, viz. that irritation in the stomach caused spasm, and that this led to increase in muscular tissue. The symptoms were vomiting, constipation, emaciation, and, at the same time, hunger. Physical signs were gastric peristalsis, dilatation at last, and rarely a palpable pyloric tumour. Prognosis was bad if at all advanced. He operated first by divulsion, next by a combination of divulsion and gastro-enterostomy, and now showed 4 cases out of 6 done recently by a different method. The stomach was seized and opened, and first sinus forceps, then dressing forceps, passed into the narrow pylorus. An incision was made externally through the thickened band, and the last forceps were opened, causing divulsion and also widening this incision. The latter and the stomach wound were then closed. This promised very well. Drs Barlow, Ritchie, Hunter, Geo. Buchanan, and the President discussed these cases, and Dr Nicoll replied.

2. Dr Nicoll also gave a communication of prostatectomy, emphasising certain considerations that had been forced upon him as a result of over 100 operations for removal of the gland. Treatment of enlarged prostate might be medical, might be by catheter, or finally by operation. If the latter was decided on, one should not delay too long. Three methods were available, the supra-pubic, the perineal, or the combined. If one desired to retain the integrity of the bladder-wall, the combined route should be chosen; if one did not regard it, the supra-pubic route was good. Dr Nicoll discussed the various changes in technique since 1893, and criticised some of Mr Freyer's statements. His results as far as mortality went, had been as follows: in his first 48 cases he had had 8 deaths (8.3 per cent.), in the next 25 there were 5 deaths (20 per cent.); and in the last 38, only 2 deaths (5.5 per cent.). He believed the mortality might now be placed at between 5 and 6 per cent.

3. Dr Geo. B. Buchanan read a paper on the use of scopolamine-morphine for general anæsthesia. Scopolamine was an alkaloid closely allied to, if not identical with, hyoscine, and had been used like the latter as a sedative in maniacal

excitement. Terrier had employed it along with morphine to produce general anæsthesia, his procedure being to give an injection (hypodermic) of 1 mgr. scopolamine and 1 cgr. of morphine 4 hours before the operation, to repeat it 2 hours later, and lastly to give a third dose 1 hour before the patient was placed on the table. Dr Buchanan had tried it in a series of cases; it caused deep sleep with dilated pupils, rather full quick pulse and slow respirations. He had used it in operations for varicocele, for radical cure of hernia, and for removal of fibrous tumour of labium majus, etc. In every case it was found necessary to give a very little chloroform as well. After the operation the patient usually slept well for several hours and awoke feeling pretty well. Out of 4345 cases where it had been used, 23 deaths had occurred (1:200), giving a fatality rate much higher than other anæsthetics. Dr Buchanan thought it might have some scope in quieting nervous patients prior to giving of chloroform or ether.

Glasgow Obstetrical and Gynæcological Society

THE second ordinary meeting was held on November 22—the President, Dr J. K. Kelly, in the chair. There was a large attendance of fellows.

1. Dr Alice M'Laren showed: (*a*) A uterus she had removed for carcinoma of the body, from a woman of 46; the growth occurred as a polypus at the fundus. (*b*) A very complete membranous cast of the uterus from a woman who suffered much from dysmenorrhœa.

2. Dr Louise M'Ilroy showed a large fibroid of the cervix which she had removed for pressure symptoms.

3. Dr J. K. Kelly showed cancerous ovaries with tubes involved, and also a myomatous uterus with ovarian cyst.

4. Dr A. W. Russell then opened a discussion on the mechanism, diagnosis, and management of persistent occipito-posterior position. These persistent cases were either occipito-posterior at the start or became so by bad rotation. Edgar, in his recent work, gives 20 per cent. as those in this position to start with; while Croom, out of 442 admissions to the Edinburgh Maternity, got 59 with the occiput back at the start, or 14 per cent. Most rotate forward, but a few (1.7 per cent. Naegeli, 4 per cent. Edgar) pass back. In etiology one must note oblique position of uterus, incomplete flexion of head, size of child, shape of pelvis, relaxation of pelvic floor, foot and hand presenting with head, etc. The head goes back, there is a want of proportion between the bi-parietal diameter and the oblique of the pelvis,

further rotation back takes place and the head may descend with occiput and sinciput level. There are five inches of sacral curve to be traversed and then five inches of perineum, and the latter nearly always suffers more or less. Croom has drawn attention to another lesion, viz. a laceration of the vagina high up at level of ischial spine, which may leave a troublesome sinus. In diagnosis one is aided by the irregular protracted pains of the first stage, the early rupture of bag, the determination of an anterior fontanelle, and parietal suture, etc. Treatment might be prophylactic, getting the patient to assume the knee-elbow posture twice daily towards end of pregnancy, then lying on side towards which the occiput lies.

In treatment actually, if the head is at the brim, generally wait; some writers recommend podalic version at this stage. The forceps may be used here to aid rotation, then removed, and re-applied to aid flexion. When the head is in the pelvis, if the child be dead, perforation is good; if alive, long straight forceps may be applied, or Milne-Murray's for occipito-posterior cases (slight pelvic curve). At the outlet use forceps, or try Herman's plan of aiding rotation by one hand internally and the other outside to push round the body.

Dr Sloan said that the normal mechanism was perverted chiefly through diminished uterine power, partly through the opposition of the pelvic floor. Rotation can take place at the brim, or between sacro-sciatic ligament and vulva, not elsewhere. In treatment he did not think manipulation much good. High up, axis-traction forceps might be used to produce descent, not for rotation directly, and in the cavity long straight forceps, or Milne-Murray's with slight curve. No one pattern of instrument will do for every case. If it be a really persistent face-to-pelvis, then aid flexion, aim at softening the parts, and deliver with forceps.

Dr Munro Kerr said that he had found no constant rule between size of child or shape of pelvis and occipito-posterior cases. He believed that the presentation often existed for weeks before labour set in. Postural treatment he had found little use, but he highly approved of Herman's plan of grasping the head internally to aid rotation, while the external hand pushed forward the anterior shoulder. Sixty per cent. of the cases could be so rectified; if it failed, forceps should be applied, and descent might cause rotation forwards. If it failed too, deliver as such and save the perineum as far as possible.

Dr Stark said he believed these cases were really more common than supposed at the beginning of labour, and that a good many righted themselves; the way to find out was to palpate well before labour.

Dr Lindsay and Dr Caskie spoke from the point of view of the general practitioner; and the President, in a few words, commended the use of the straight forceps in these as well as in other cases.

Glasgow Pathological and Clinical Society

THE third ordinary meeting took place on December 11—the President, Professor Muir, in the chair.

1. Dr Alfred A. Young showed a patient, a young man of 23, with an unusual form of cancer of the scalp. The patient had been operated on eight months before for the removal of a wen, and now presented a distinct growth involving a large part of the scalp, and causing enlargement of the glands, beside the sterno-mastoid. It presented the appearance of a rodent ulcer, but the deeper parts of the tissue showed it to be a true basilar epithelioma. Removal was not possible. A somewhat similar case had been met with before, where an epithelioma had developed in the scar of a wound after resection of a rib for empyema. The patient in this instance was 42, and the growth presented itself as a subcutaneous nodule. Dr Young also showed a specimen of melanotic sarcoma of the arm in a woman of 40. It had originated in a pigmented mole, and had caused enlargement of the axillary glands as well as presenting other features more suggestive of cancer than sarcoma. The glands and the growth were excised, amputation being refused. Progressive cachexia set in and the patient died.

2. Drs T. K. Monro and J. W. Findlay described the clinical and anatomical features of a case of sub-acute spinal muscular atrophy, and showed microscopical specimens. The patient, a man of 56, after complaining of indefinite symptoms of weakness for a year, came under observation with atrophic paralysis of the lower limbs of a few months' duration. Sensory disturbances existed, and the knee-jerks were absent. The power of the upper limbs was somewhat diminished, but the tendon-jerks were active. After three months' residence in hospital, during which time the atrophy of the legs progressed, and paralysis of the bladder and rectum occurred, he died of pneumonic gangrene.

The most striking features of the histological examination were:—(1) the great paucity of the motor nerve-cells in the lumbar and sacral segments of the cord; (2) the degenerative character of a goodly number of those nerve-cells which still persisted; (3) the very considerable atrophy of the anterior nerve-roots in the same region; (4) the atrophy of the anterior crural nerve and its smaller muscular branches; (5) the almost

complete replacement of the muscles of the thigh (and one may surmise of the legs also) by fatty and connective tissue; (6) and lastly, evidence of degeneration of the pyramidal tracts.

3. Dr J. Stoddart Barr (introduced by Dr Logan Taylor) read notes on a fatal case of septic thrombosis of the lateral sinus secondary to chronic otitis media and complicated by septic infarctions in the right lung. The patient, a girl of seven, was admitted to the Glasgow Ear Hospital on September 20, 1905. Chronic discharge from the left ear had existed for a year, and within fourteen days urgent symptoms had supervened —headache, aural pain, vomiting, and frequent and severe rigors, with marked rises of temperature; for several days there had been cough as well. The child looked very ill; shortly after admission the temperature rose to 104° F., there was dullness with tubular breathing and moist sounds over the base of the right lung, and both eyes showed evidence of recent optic neuritis. The day after admission Dr Stoddart Barr did the radical mastoid operation, and exposed and opened the sigmoid sinus for fully two inches, clearing it of a septic thrombus. The thrombus was found to extend into the jugular, and reached backward to within one and a half inches of the torcula. The patient sank, dying thirty-six hours after operation. The post-mortem was done by Dr James Walker, who found no further mischief in the cranial cavity; in the base of the right lung, however, were two septic infarctions with surrounding consolidation.

Dr Barr remarked that had operation been done a few days earlier, before pulmonary infection had begun, a different result might have followed. He emphasised the fact that when rigors with violent oscillations of temperature occur in the course of middle ear disease with purulent discharge, operative interference is urgently called for; general practitioners had not yet fully grasped the grave significance of these symptoms. In septic sinus thrombosis, operation carried out early is probably more successful than in any other form of intracranial complication due to ear-disease. Hence the need of early recognition. In conclusion, the speaker referred to the question of preliminary ligature of the internal jugular vein in these cases, as suggested by Nicoll and Ballance.

Forfarshire Medical Association

AN ordinary meeting of this Society was held in Dundee on Thursday evening, December 7. The President, Dr Sinclair, occupied the chair.

Dr R. C. Buist exhibited two specimens of cancer of the uterus, with disease of the appendages, which showed several points of interest in the natural history of the disease. The patient from whom the first specimen was obtained had no idea, until three weeks previous to her admission to hospital, that she suffered from so serious a malady, her only symptom being profuse hæmorrhages of a few weeks' duration. Complete extirpation of the uterus with the appendages was performed; the operation was very difficult owing to extensive bladder adhesions. Along with advanced cancer of the cervix, there were present a hydro-salpinx and an ovarian cyst. In the second case, the symptoms had existed for five months, yet the uterus was freely movable and the operation was easy. The same conditions of cervical cancer and ovarian cyst and hydro-salpinx were present. The various conditions thus illustrating each a stage of cell degeneration.

Dr George Whyte described a case of Belladonna poisoning. A few months ago he was called to an urgent case and found a woman delirious, excited, and talkative. There was no history of alcoholism. She complained of dryness of throat and mouth, pupils were dilated, and did not react to light. Three days previously, for the relief of a pain in her back, she had applied a porous plaster. This caused very great skin irritation, and scratching in the neighbourhood of the plaster had allowed of rapid absorption of the incorporated material, evidently Belladonna. Immediate removal of the plaster, and one-sixth of a grain of morphine repeated occasionally, gave complete relief from the distressing symptoms.

Drs Buist and Don mentioned having seen similar symptoms after the application of Belladonna plasters to the breasts. Dr Sinclair drew attention to the fact that Emplastrum Belladonnæ B. P. now differs in strength from the old plaster formerly in use.

Dr J. Mackie Whyte reported an unusual case of suppurative hepatitis, a full account of which will appear in next month's *Journal.*

Dr Halley read notes upon two cases of sciatica which he had treated by isolating from adhesions and stretching the sciatic, internal popliteal, and posterior tibial nerves, with excellent results. In the first case the sciatic nerve of the left leg was isolated and stretched. This was followed by disappearance of pain above the knee, but on the eighth day after the operation severe pain recurred below the knee, which was only relieved by hypodermic injections of morphia. A second operation was agreed upon, and the internal popliteal and posterior tibial nerves were treated in a similar manner,

producing almost immediate and permanent relief from pain.

In the second case the three nerves were treated at one operation. This differed from the first case in that there was no pain except when walking. Twelve days after the operation slight pain was complained of in the calf and foot, especially at night, but it gradually disappeared. Dr Halley, in his remarks, dwelt on the importance of removing the adhesions round the nerves, and in certain cases in stretching the branches as well as the main nerve trunk.

In the discussion that followed, objection was taken to the fact that the cases were acute, and had little or no previous medical treatment. In reply, Dr Halley said he operated upon the first case, although it was of but two weeks' duration, because the patient had previously been affected in the same side, indicating the possibility of adhesions being the cause of the severity of the pain complained of. He did not consider it necessary or advisable to open the nerve sheath.

Aberdeen Medico-Chirurgical Society

AT the November meeting of the Aberdeen Medical Society the following office-bearers were appointed for the year:—President, Professor A. Ogston, C.M.; Vice-president, A. Rudolf Galloway, M.A., M.B., C.M.; Secretary, J. Marnoch, M.A., M.B., C.M.; Treasurer, A. Lister, B.A., M.B., C.M.; Librarian, P. Howie, M.B., C.M.; Recording Secretary, D. Rennet, M.D., D.P.H.; together with the following Members of Council—Professor J. Theodore Cash, M.D., F.R.S.; G. Rose, M.B., C.M.; J. Scott Riddell, M.V.O., C.M., M.B., M.A.; A. W. Mackintosh, M.A., M.D.; F. Kelly, M.D.; J. R. Levack, M.B., C.M.

Editorial Notes and News

The Retirement of Sir Henry Littlejohn.

IT is hardly possible to realise the Edinburgh Medical School without Sir Henry. Lists in old calendars giving the names of recognised Lecturers and the dates of their recognition testify to his long connection with it. For although all others have their dates, the note to Dr Littlejohn's name indicates that he commenced lecturing in the prehistoric period "before 1861." His inimitable lectures have been the joy of the thousands of students

who have passed through his hands, and recollections of them and their discussion has been, and long will be, a bond of union between different generations of Edinburgh graduates. He carries with him into his retirement the good wishes of all his colleagues.

The Chair is in the gift of the Crown, and is of interest as the first medical appointment falling to be made by the new Secretary for Scotland. We do not think we will be accused of any undue partisanship when we say that Captain Sinclair will not have many appointments to make which need cause him less mental worry than this one.

Clinical Teaching and Examination.

THERE is no doubt that the greatest amount of knowledge, valuable to the healing art, has been and is being obtained in hospitals in which, with the treatment of the sick and hurt, there is combined the teaching of medicine and surgery. It is true that to this general law there may have been exceptions, and possibly the brilliant work of the French physician, Duchenne, in the non-teaching hospital at Boulogne, is the most striking example of such. This, however, does not invalidate what has just been stated; and that it should be so, all who know anything about what the teaching of medicine and surgery means can easily understand.

On the other hand, it is not inconceivable that in a hospital into which, along with the trained physicians and surgeons, students have the entrée, the experience of the patients may be at a time not so absolutely fortunate as could have been desired. Each budding physician, surgeon, dentist, or accoucheur must perform a paracentesis, perform an amputation, extract a tooth, or conduct a labour, for the first time in his life, and this or that hospital patient must be his patient. Still, with the supervision and care exercised in every first-class medical school, it may truly be said that in the teaching hospital, whilst the disadvantage to the individual is at its minimum, the advantage to the healing art and to humanity is at its maximum.

All this is a preliminary, and, it is evident, an important preliminary to the answer to the question as to how we can at the present moment do our best for clinical teaching in the Infirmary. We must remember that the interests of the sick and hurt, and of medical science, must go, as it were, exactly abreast, and we must remember that if one or the other is allowed to shoot ahead, there must thereby occur injury to humanity as a whole.

Accordingly, it is of importance that in all the re-arrangements which must shortly be made as regards clinical teaching,

we should recognise the advantage, from every point of view, of two rather important changes in our system which have been suggested.

The first of these is that arrangements should be made to combine clinical teaching and clinical examining in the wards, that is to say, that the candidates for the degree or diploma should be examined in Clinical Medicine, Clinical Surgery, etc., at the cliniques, and in presence of the students, just as students themselves are. At present, as we know, teaching and examining are kept severely apart, and our contention is that a combination of them would be of immense advantage, from the points of view alike of the patients, the students, the candidates, and of medical science.

From the point of view of the patients it would be advantageous, inasmuch as, as every medical or surgical examination causes some inconvenience, the present system subjects the patients to an inconvenience which might be avoided. It would be further advantageous, inasmuch as proper supervision would be exercised during the examination of patients by students and candidates alike.

From the point of view of the students it would be of advantage, inasmuch as quite as valuable instruction would be afforded them by their being present at the cliniques at which candidates were being examined, as at those in which the examinations concerned students alone.

From the point of view of the candidates it would be advantageous, inasmuch as having witnessed such examinations time after time, they would know exactly what was to be required of them, would work up towards this, and would, when they felt capable, present themselves for examination with a confidence based on the secure foundation of their own knowledge.

From the point of view of medical science it would be advantageous, inasmuch as it would afford to the physician, surgeon, resident and clinical assistants, a greater amount of time, which could be devoted to efforts towards the more precise investigation of disease, and the advance of medical and surgical knowledge.

It is evident, further, that professional clinical examinations conducted in this way could not but be absolutely fair; the publicity of the whole proceeding would ensure this. It is also evident that they could be conducted in this way at a distinctly less cost than they are at present. Just as in chemical manufactories the price of the manufactured article can be lessened when the bye-products can be properly made use of, so with the licensing bodies would it be in their manufacture of medical practitioners.

The second of the proposed changes is that arrangements should be made for the conduct of clinical examinations as well as of teaching equally all over the medical and surgical sides of the Infirmary. It is evident that if the students know that their clinical examination will be conducted in these or those wards, and by these or those physicians or surgeons, they in their anxiety to pass their examinations will tend to do their clinical work in these or those wards, and under these or those physicians and surgeons, and that thus there will be a tendency to overcrowd certain wards to an undue extent. No one will grudge to the distinguished physician or surgeon a plethora of students, but this must be, not an artificial plethora, but a natural one, and one, therefore, which is just and right.

No one also that will not joyfully accord to the University the privilege of selecting for its Chairs, whenever it may seem desirable, physicians and surgeons from schools and hospitals outside Edinburgh, and of having them installed as such in the wards of our Infirmary. But care must be taken in the case of these also that any plethora of students to their wards shall be a natural one. It is evident that the existence of any artificial condition which will lead to an undue influx of students into one set of wards must be injurious to the interests of the patients; and, indeed, it is only the truth to say that a consideration of the whole subject of clinical teaching and examining is now imperatively demanded.

Gynæcology. IF the rumours floating around are correct, we can only reiterate the hope expressed last month that some of the various authorities concerned will pause before accepting the schemes attributed to the Medical Faculty. We recognise, of course, that rumour may be wrong, and we fervently hope it is, for it would be simply lamentable should such an opportunity of reform be wasted. We have not met anyone who does not agree that Gynæcology should be separated from Clinical Medicine, and we are entirely unable to understand the reluctance of the University to accept the situation. There are no vested interests to deal with, and surely some better plan than the intricate, entwined one which is spoken of might easily be devised. But if its sponsors are determined on the scheme, the whole scheme, and nothing but the scheme, we can only in conclusion express the hope that the Managers of the Royal Infirmary will, if they do accept it, limit its operation to a very short experimental period.

Prof. Berry. DR BERRY is the latest of the long list of anatomists trained in Edinburgh who have gone forth to fill Chairs all over the world. Of the fifteen Chairs of Anatomy in Great Britain, ten are occupied by Edinburgh graduates, two by graduates of Aberdeen, while Cambridge, Glasgow, and Dublin supply one each. It is a record of which the venerable Principal may well be proud.

As a lecturer in the Extra-Mural School, Dr Berry has been a great success. Students are keen judges, and it did not take them long to find out that in Dr Berry they found a teacher amply endowed with all those qualifications essential to success in an extra-mural lecturer. A sound anatomist, an enthusiastic and stimulating teacher, and a true friend, he soon gathered, and in spite of powerful competition retained large classes, in which were generally to be found many of the best men of the year. But much though he will be missed as a teacher, it is not chiefly as an anatomist that his loss will be felt in Edinburgh. Deeply imbued with the reforming spirit of his native county, he soon began to make his influence felt in University matters, and it is chiefly owing to him that the movement for the reform of the Medical curriculum was initiated. For that he worked early and late, sparing no trouble and omitting no detail which might facilitate the work of those of his colleagues who, though their spirits might be willing, had not his gifts of application. And above all, we shall miss the example of his fearless courage. He has shown the merits of the true statesman in always saying what he thought right, and never saying it offensively. Even those from whom he differed always acknowledged his fairness, and we do not believe he leaves behind him a single enemy.

His popularity was testified to by the huge gathering of students who turned out to present him with a token of their regard, and not less significant was the send-off dinner to which his colleagues in the School entertained him on the night prior to his departure.

The University of Melbourne is to be congratulated on its choice, and on the wisdom which led it to expand a little the very early age limit which it sets on its professors.

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apanese Naval Surgery. AT the annual meeting of the United States Association of Military Surgeons, Dr Suzuki, Surgeon-General, Imperial Japanese Navy, read a paper upon "Notes on Experiences during the Russo-Japanese Naval War, 1904-5." From time to time during the war the attention of Western nations has been directed to the wonderful immunity of the Japanese to disease

in their campaigns in Manchuria, and various explanations have been given why this should have been. The chief reason which has been accepted seems to be that extraordinarily good preventive measures were adopted by the authorities, that the soldiers themselves assisted, and that their simple diet was an important factor. In this paper by the Surgeon-General of the Navy, we have an excellent opportunity to judge of the clear-sighted and common-sense precautions adopted by the Naval medical department; precautions which were sanctioned by the combatant authorities. Indeed it is quite evident that the latter recognised how important a part medical science plays in practical warfare. Aseptic treatment and conservative methods of surgery were used. First aid was given on board the fighting ships, and at the earliest time possible the wounded were transferred to hospital ships for conveyance to home hospitals. Aseptic surgery during an engagement is necessarily difficult, but the results were good. Suturing the skin so that open surfaces were closed proved a great protection to wounds. The minutest details were previously thought out. To prevent septic infection, the men were instructed before action to put on clean underclothing. The gunners had plugs of corrosive wool placed in their ears to avoid rupture of the tympanic membranes, and boric lotion was supplied to them at the guns to wash the eyes and free them from dust and powder. Guns were covered with hammocks to prevent splinters flying to a distance, while the men who were not working guns were made to lie at the side of the ship next the enemy, where the radius of flying fragments from bursting shells, etc., was less, and wounds not so likely to be caused. These constitute some of the details which were attended to; but even during the first fighting which took place, observation was used and practical suggestions resulted. The wounds made by splinters and gunshots were larger than could be covered by the ordinary first aid dressing, and time was lost in opening and applying more packages, therefore a larger first aid dressing was requisitioned and served out. It was easier to open, saved time, and facilitated the dressing of wounds. In the same way the best plan for wounded men to be carried from dangerous places, and the best place to put them, was attended to. Two surgeries instead of one were provided, and their equipment was made as practical and complete as human forethought could devise. Large tailor's shears were in each, these being useful to cut off the clothes of wounded men; jugs with long, narrow spouts for water, these being more readily used than drinking-cups.

It all seems so simple. Can it be carried out in action, and does it attain the end in view? It can be done in the Japanese

Navy, and the results seem to justify the methods. From the beginning of the war to 15th August 1905 the total of wounded was 1791. Of these, 171 died; 73 were invalided; 131 are under treatment, and 1470 recovered.

We conceive that the Japanese are much as other men in regard to intelligence, but as a people they are determined to attain their end. In their Navy the Admiral and the Surgeon-General work in unison; they are taught by experience and benefit by it. The individuals who compose the Army are intent to succeed. In a "Staff-Officer's Scrap-Book," Sir Ian Hamilton describes an incident of which he was an eye-witness, and says: "Each private soldier was going his very level best, with the tense, concentrated look on his face which it takes at least a cricket-ball, foot-ball, or polo-ball to call up to the countenance of the average Anglo-Saxon." When shall work —the nation's work—produce that tense concentrated look on the face of the British working-man? When shall we have unison in the work of the combatant and medical officers in the British Army or Navy?

Human and Bovine Tuberculosis.

THE question of the relationship of human and bovine tuberculosis has long been a subject of discussion, and when Professor Koch, some years ago, convinced himself that human tuberculosis is a totally distinct disease from the *Perlsucht* of cattle, and that the latter is not capable of infecting human beings with tuberculosis, the question immediately became one of universal interest and of practical importance. So long as there is any doubt as to the danger to human beings of milk and meat derived from tubercular animals, health authorities are scarcely likely to be very energetic in carrying out radical measures of elimination. Naturally enough, therefore, the question raised has provoked an enormous amount of discussion and research, and, unfortunately, it cannot be said that any unanimity of opinion has yet been reached.

Among the upholders of the identity of human and bovine tuberculosis, perhaps the most extreme is Von Behring, who does not admit the occurrence of inhalation tuberculosis, but claims that nearly all cases are acquired in infancy through the gastro-intestinal tract. His theory is that tubercle so acquired may remain latent until lighted up at some subsequent period of life by unhygienic surroundings, bad health, or other causes.

At the recent Congress on Tuberculosis in Paris, an important paper from the opposite point of view was read by Professor Kossel of Giessen. A full translation of this paper appeared in the *Brit. Med. Journ.* for December 2. Professor Kossel details

the results obtained by him during several years at the Kaiserliche Gesundheitsamt at Berlin. The first part of his paper deals with the question: Is *Perlsucht* in Cattle spread by the same Germ as Tuberculosis in Man? The negative answer to this question is based upon the morphological differences of the bacilli from the two sources, their different behaviour on culture media, and the results of experimental infection. Bacilli from bovine sources were found to be extremely infectious to calves, whether the latter were made to inhale the bacilli, fed upon cultures, or subjected to the injection of minute doses. On the other hand, calves display a marked insusceptibility to human tubercle bacilli. Even three months' feeding on cultures of the bacilli caused only an accumulation of the organisms in the mesenteric glands, with calcification, and with no dissemination throughout the body, as would inevitably have happened with bacilli of the typus bovinus. Inhalation experiments also gave negative results, and subcutaneous injections caused only a local reaction at the seat of infection and in the neighbouring lymphatic glands.

The second part of Kossel's paper discusses the question whether man is susceptible to the disease germ which causes *Perlsucht* in cattle. To this question the reply is in the affirmative. Tubercle bacilli of the typus bovinus are to be found in certain cases of human tuberculosis. They are to be found especially in the case of tuberculous lesions in children, and in them chiefly in mesenteric glands or in tubercular ulcers of the intestines. In the ordinary phthisis of adults the bacilli present are almost invariably of the typus humanus. Tubercle bacilli of the typus bovinus can be transmitted to human beings by food derived from tuberculous animals, especially by milk of cows affected with tuberculosis of the udder. The part actually played by infection from bovine sources in spreading tuberculosis in man, however, is small in comparison to the danger threatening from a consumptive human being.

It is obvious that the differences between the upholders of the two theories regarding human and bovine tuberculosis are due to differences in the results of experiment, and can be settled only by further research. Professor Hamilton, for instance, tells us that human tubercle, although probably not so virulent for the calf as that derived from bovines, can yet be inoculated upon that animal quite readily, and that this holds good whether the bacilli are introduced by feeding, by respiration, or by subcutaneous injection.

In view of these differences of opinion, Professor Kossel's admission that bovine tuberculosis can be transmitted to man is an important one, as it obviously justifies measures for pre-

venting the transmission of tuberculosis by food. It will probably be a long time before complete agreement is reached as to the exact degree of relationship between the two strains of bacilli; but, in the meantime, public health authorities may take courage and go forward.

Royal College of Surgeons of Edinburgh

AT a meeting of the College held on 15th inst., the following gentlemen, having passed the requisite examinations, were admitted Fellows: Russell Gerald William Adams, L.R.C.S.E., Blenheim, New Zealand; John James Bell, L.R.C.S.E., Manningham, Bradford; Norman Duncan Buchanan, M.B., M.R.C.S. Eng., Zurich, Ontario; Thomas Marshall Callender, M.D., Sidcup, Kent; Khursedji Nasserwanji Karanjia, M.R.C.S.Eng., London; William Mackenzie, M.B., Edinburgh; Owen St John Moses, M.D., Captain, I.M.S.; Jamshijd Dadabhai Munsiff, L.R.C.S.E., Edinburgh; William Ernest O'Hara, L.R.C.S.E., Edinburgh; William Guthrie Porter, M.B., Edinburgh; Walter Alexander Ramsay Sharp, M.B., Sydney; Herman Stedman, L.R.C.S.E., London, E.; Henry Young Cameron Taylor, M.B., Govan, and Alexander Wilson, M.D., Bearsden, Dumbartonshire.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

GYNECOLOGY

By J. W. BALLANTYNE, M.D., F.R.C.P.,

Lecturer on Midwifery and Gynecology in the Medical College for Women, Edinburgh; Physician to the Royal Maternity Hospital, Edinburgh, etc.

OBSTETRICAL ASPECTS OF SOME GYNECOLOGICAL STATES

IT is only when one begins to try to separate the teaching of Obstetrics from that of Gynecology that one learns how closely interwoven these two subjects are with one another. To illustrate their interdependence, it will be convenient to refer to some recent contributions to current literature.

Dr G. Gouin, in the August number of *La Gynécologie* (vol. x. p. 289, 1905), discusses the advantages of **Physiological Hysteropexy** from the obstetrical standpoint. He points out that in the natural growth of the uterus in pregnancy it is in the fundus and the posterior wall that the greatest development takes place, and that therefore the portion of the organ to which

the round ligaments are attached is less affected by the gestational changes than any other part. He argues that to correct retro-displacement of the uterus (in a woman who may still become pregnant) by such operations as abdominal or vaginal hysteropexy is unnatural, and he calls such operations anti-physiological hysteropexies. They suppress the natural mobility of the uterus and prevent its physiological development in pregnancy. Whereas to act on the organ by shortening the round ligaments merits the name of physiological hysteropexy, for it leaves it free to rise in the abdomen and to retain its normal relations with the bladder, and it does not lead to compression of the nervous plexuses on its anterior aspect.

Gouin has collected statistics from various sources, bearing upon the effect of abdominal hysteropexy upon subsequent pregnancies. Abortions and premature labours would appear to have been common. In a case reported by Lamort, abortion occurred on two occasions; after the second occasion the observer ruptured the artificially produced adhesions under chloroform and set the uterus free; the patient thereafter conceived and carried a child to the full term. Pain and hæmorrhage during pregnancy may likewise follow abdominal hysteropexy, but it is not clear that hyperemesis gravidarum is thus caused. Rupture of the uterus has occurred, generally it would seem when the organ had been fixed *by its fundus* to the abdominal wall. In labour, malpresentations are very common, and inertia uteri, premature rupture of the membranes, and wedging of the anterior lip of the cervix are frequent; these occurrences necessitate recourse being had to artificial cervical dilatation, the use of forceps, version, cervical incisions, and even the Cæsarean section. It is to be noted that far less troublesome consequences follow in the cases of abdominal hysteropexy in which the uterus is fixed to the abdominal wall by the middle part of its anterior surface and not by the fundus. What has been said regarding abdominal hysteropexy applies still more forcibly to the *vaginal* operation; it has serious dangers for any subsequent pregnancies and is not to be employed in women capable of bearing children. One of the partisans of the vaginal operation warns the operator that *it must not be done too well!*

The idea of shortening the round ligaments was conceived by Alquié of Montpellier in 1840, and was practised for the first time by Alexander of Liverpool in 1881, and independently by Adams of Glasgow in the same year. The ligaments were drawn out of the inguinal canals and shortened, and future pregnancies were little, if at all, interfered with, and dangerous results were practically unknown. But the Alexander-Adams operation was not always practicable, and as it became a

common procedure to open the abdomen on account of diseases of the ovaries and tubes, so it was found to be convenient to conjoin with the laparotomy the operation of intra-abdominal shortening of the ligaments. This plan gives very satisfactory results and is denominated physiological hysteropexy. Further, it may be performed during pregnancy. Thus in cases of fixed retro-deviation of the gravid uterus it is a question whether instead of provoking abortion an abdominal section should not be performed, the uterus replaced and fixed in its normal position by shortening the round ligaments. Doléris has in three cases of retroversion of the gravid uterus performed a "liberating laparotomy" followed by intra-abdominal fixation of the round ligaments; all the three patients were delivered normally at the full term, and they were seen several months later, when in every case the uterus was in its normal position.

Gouin gives the results of 22 cases in which pregnancy followed the Alexander operation (in 12 instances) and the intra-abdominal shortening of the ligaments (in 10 instances). In all of them the evolution of pregnancy was normal; the labour was at the full term and spontaneous in all but two (premature labours due to other causes than the operation).

The conclusions which Gouin draws (founded on results in Doléris' practice) are as follow: (1) Abdominal and vaginal hysteropexy are anti-physiological and dangerous methods of uterine fixation, and are to be abandoned during the period of reproductive activity. (2) Shortening of the round ligaments, on the contrary, is a natural and a physiological procedure; it is the operation of choice for women during the age of reproductive activity, and it has the following advantages: (*a*) it places the uterus in the most favourable position for impregnation; (*b*) it does not hinder the development of the pregnant uterus; (*c*) it does not cause dystocia; and (*d*) it gives results which last after several pregnancies have passed. (3) Intra-abdominal shortening of the round ligaments is superior to the Alexander operation, for it enables the operator to see the state of the uterine annexa, to break down the adhesions which are keeping the uterus out of its place, and to seize the ligaments near the uterus and so fix it in good position.

Another gynecological malady which has sometimes an obstetrical bearing, is the **Ovarian Cyst.** An interesting case was recently reported by Tarantino (*Annali di ostetricia e ginecologia*, vol. ii. for 1905, p. 190, August 1905), in which an ovarian tumour existed during pregnancy, and on *several* occasions was accompanied by symptoms suggesting torsion of the pedicle. The patient was 40 years of age, and was pregnant for the

tenth time. The labour took place naturally. Some time afterwards, however, she noticed that the tumour, which had been movable, was fixed. She had another attack, suggesting twisting of the pedicle. Laparotomy was performed and a serous cyst of the right ovary was removed; it was adherent by its walls to surrounding parts, but the pedicle had been separated by torsion. No doubt the adhesions, becoming vascular, had maintained the nutrition of the cyst, and had become secondary pedicles, so to say. It is noteworthy that in this case the tumour was large enough to be easily recognised during two pregnancies, and that in the last one there was also torsion of the pedicle, yet the gestations went to the full term and ended normally. At the same time a very dangerous state of affairs would have been obviated if the ovarian cyst had been removed earlier. The occurrence of labour may produce rupture of the cyst or its pedicle may be twisted, and adhesions may develop or acute peritonitis follow. As a general rule, ovariotomy is indicated in all cases of pregnancy complicated by an ovarian cyst.

Another gynecological state, which has sometimes an obstetrical aspect, is **Fibro-myoma of the Uterus.** When a pregnancy is complicated by a fibroid or by fibroids, abortion may commence, and, under these circumstances, it is best to treat the case as one of incomplete abortion (clear out the uterus). In other circumstances pregnancy goes on, and the tumour may slip up with the uterus into the abdominal cavity, and labour take place with little or no special difficulty. In other cases the growths may block the pelvis and necessitate the Cæsarean section at the full term. But the complication of pregnancy with a fibroid is not always met in these ways. Dr Brothers, for instance (*American Journ. of Obstetrics*, vol. lii. p. 562, Oct. 1905), recently met with a case in which he performed myomectomy during pregnancy, and left the gestation to go on. The case was interesting in several ways. The patient was 25 years old and had only been married five weeks; she was last unwell 45 days previously. Two large tumours could be felt in the abdomen, one of which was clearly attached to the uterus, which had the signs of being pregnant. One of these showed signs of having a twisted pedicle, due, perhaps, the author thinks, to disturbances brought on during sexual intercourse. The induction of abortion was considered but rejected, for even if it could be safely performed, exactly the same state of affairs might arise again in a fresh pregnancy. To allow pregnancy to proceed to full term, and trust to the possibility of pushing the tumours out of the way, seemed wrong practice

for one of the growths at least could not be moved much even then. The Cæsarean section or the Porro operation at full term might be considered, but there was always the risk of spontaneous abortion, with all its dangers, long before term was reached. Further, the myomata might grow rapidly during pregnancy. It was therefore determined to open the abdomen and perform myomectomy, if possible, before the pregnancy had gone any further. At the same time, consent was obtained for a hysterectomy if a myomectomy were impracticable. Accordingly, when the pregnancy was at the estimated age of two months, the abdomen was opened. On the right side a large myoma, with commencing torsion of the pedicle, was found; it was amputated, the vessels of the pedicle were independently secured, and the two edges of the cut pedicle were approximated and secured by suture. The tube and ovary were normal. The left tumour was brought up out of the pelvis and treated in the same way; it was probably a fibroma of the left ovary, for the tube, but no ovary, on this side could be found. Four smaller sessile fibroids were removed from the uterine wall at various places; some left beds which had to be sewed over to prevent hæmorrhage. The uterus had the appearances of early pregnancy. The patient made a good recovery and went home on the eighteenth day.

PUBLIC HEALTH

By C. J. LEWIS D.Sc. (Public Health), M.D., F.R.C.P.,
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Experimental Measles.—Attacks of measles induced by deliberate inoculation are reported by Hektoen (*The Journal of Infectious Diseases*, vol. ii. No. 2, March 1905) under the above title. Since measles is not known to be communicable to animals, experimental inoculation of measles must be tried upon human beings. The author gives an historical account of previous attempts at the inoculation of measles and indicates the probability that many of these efforts were unsuccessful though reported as successful. This conclusion has its basis in the absence or insufficiency of precautions for the prevention of ordinary methods of infection amongst the persons inoculated. Hektoen describes two cases in which he was able to induce by inoculation undoubted attacks of measles.

The first record of inoculation of measles is in Edinburgh in 1758 by Francis Home, who performed the operation on fifteen different persons and concluded that in most instances he had

produced the disease in a mild and modified form. From this conclusion Hektoen differs, and indeed states that probably not a single one of the fifteen cases inoculated by Home had measles as the result of the inoculation. To support this criticism Hektoen gives in tabular form an analysis of the details of Home's cases. Consideration of the facts recorded by Home regarding his experiments shows that in none of the cases was the incubation period of inoculated measles so long as the ordinary incubation period of the disease. The time elapsing between inoculation and the first appearance of symptoms was only six or seven days, and this is regarded by Hektoen as indicating infection prior to the inoculation, since in his own cases, to be presently related, this abbreviation of the incubation period was not observed. In some of Home's cases the symptoms were indefinite, and in one case a natural attack of measles followed one month after the disappearance of the inoculated measles. Home generally used blood obtained by a superficial incision at the site of eruption. This was collected on cotton and the cotton applied for three days to an incision in the arm of the person to be inoculated. At a later period other materials than blood appear to have been used by various experimenters, *e.g.* nasal and conjunctival discharges and desquamated skin. The practice of inoculation, however, did not become so common as in smallpox, and subsequently doubt was thrown upon the accuracy of these early experiments. Themmen in Holland, using methods somewhat similar to those of Home, failed to inoculate measles in five children and did not credit the results obtained in Edinburgh. Numerous other observers are quoted by Hektoen as having attempted the inoculation of measles: some of these reported success and others failure. Speranza of Mantua in 1822 recorded thirteen successful inoculations, and mentioned that the incubation period was only five or six days and that the symptoms were of an extremely mild type. Hektoen discredits these cases also on account of the abbreviation of incubation and of insufficient exclusion of possible infection by natural means. Twenty years later a large series of inoculations were made in Hungary by Katona, who, during an epidemic, performed 1122 inoculations with positive results in 93 per cent. and without any evil effects. Since these cases occurred during an epidemic, some of them may have derived the infection by ordinary methods and not by inoculation. The general success of these inoculations is striking, but there is no means of comparison with the percentage of the uninoculated who fell ill at the same time. The population may have been highly susceptible to measles if the disease had been absent for some years prior to this

epidemic. Hektoen attaches small importance to any cases in which the observer admits the incubation period to have been shortened, and in all such cases he suggests prior infection if they were genuine cases of measles. The observations of Mayr (1852) are quoted with approval, since in two of his cases the measles eruption appeared on the fourteenth day, and in all his six cases the attacks conferred subsequent immunity. Mayr emphasises the fact that inoculation of measles transfers the whole disease with its risks, and is not protective against possible complications or sequelæ. None of the authors describe local changes at the point of inoculation. After reviewing the work of these and other observers on the same lines of criticism as those already indicated, Hektoen proceeds to describe his own experiments. In two cases he succeeded in producing experimental measles and special care was taken to exclude the possibility of natural infection. The experiments were directed to determine whether at the height of an attack of measles the blood contains the cause of the disease.

In the first case the blood for inoculation was taken from a vein at the elbow on the fourth day of the attack of measles. The rash is described as a typical rubeolous rash present on that day. Four c.c. of blood were withdrawn by syringe with careful precautions and this blood was added to ascites-broth in two small flasks, 1 c.c. being added to one flask and 3 c.c. to the other. Ascites-broth is a mixture of ascitic fluid and peptone broth in certain proportions. The flasks were placed in an incubator at 37° C. for twenty-four hours. Both then appeared sterile and cultures from the flasks remained sterile under ærobic and anærobic conditions. The flask containing 1 c.c. of blood remained permanently sterile. From the other flask 4 c.c. of the mixture of blood and broth were abstracted and injected under the skin of the chest of a medical student, aged 24, who had not had measles. Natural infection was, in all probability, excluded by the fact that the patient had been isolated for twenty-six days in a hospital which was entirely free from measles. He had just recovered from a mild attack of scarlet fever. The injection produced no local symptoms at the point of inoculation, but on the thirteenth day the temperature rose to 101°, and next day a typical measles rash was present over the face, neck, chest, and body. In two days the temperature fell to normal and the eruption faded. There were no complications and the rash was followed by branny desquamation. Catarrhal and respiratory symptoms were absent.

In the second case the blood was withdrawn during the height of the rash in the same way as in the former case, but

10 c.c. were removed and this quantity was divided equally among four flasks of ascites-broth. It is stated that all these flasks remained sterile so far as bacteria demonstrable by the usual methods are concerned. After twenty-four hours at 37° C., 5 c.c. of the mixture of blood and broth were injected subcutaneously into the back of a man aged 28 who believed he had not had measles. This patient was also recovering from mild scarlet fever and had been for twenty-four days sole occupant of an isolation room in a general hospital in which at that time there were no cases of measles. No local symptoms occurred at the site of injection, but on the eleventh day the temperature rose a little, on the twelfth day there was mild conjunctivitis, on the thirteenth day there was cough, and on the fourteenth day a typical measles rash. The temperature never rose above 103° and recovery was prompt. Hektoen claims that in these two cases he produced measles by inoculation, and states as his conclusions "that the virus of measles is present in the blood of patients with typical measles some time at least during the first thirty hours of the eruption; furthermore that the virus retains its virulence for at least twenty-four hours when such blood is inoculated into ascites-broth and kept at 37° C." "This demonstration shows that it is not difficult to obtain the virus of measles unmixed with other microbes and in such form that it may be studied by various methods." These conclusions are notable in themselves and also in respect of their omissions. There is no discussion of the possible nature of the "virus," though it is spoken of by implication as a microbe, yet ascites-broth which contained it yielded no growth in various attempts at cultivation on particular media. The observations and experiments of Hektoen are valuable additions to the investigation of measles, and point out a line of research which should be profitable in ascertaining the definitive characters of the "virus."

Duration of Vitality of B. Coli Communis in various waters and in sewage.—Our knowledge of the life-history of the bacillus coli communis in water-supplies and in sewage is gradually extending and researches on the subject are still in progress. Major J. G. M'Naught reports (*Journal of the Royal Army Medical Corps*, July 1905) several series of experiments and comes to certain conclusions. The general result of his investigation is to show that the constant occurrence of B. coli in an impure water, or in a water containing many micro-organisms, is due to a constant or frequent contamination with matters containing the bacillus, while its occurrence in a relatively pure water may be due to a single contamination of

remote date. It was found that the duration of life of the B. coli in unsterilised water varies greatly in waters from different sources. Specimens of different waters were inoculated with similar quantities of a culture of the bacillus, and endeavours were made to recover the organism at definite intervals. In some waters the bacillus could never be recovered later than a fortnight or three weeks from the inoculation, while in other waters it survived for many months. The greater the bacteriological purity. of the water, the longer did the bacillus coli survive in it. In the same waters sterilised before addition of the culture of bacillus coli, the organism did not rapidly die out but was recoverable for several months, in some cases for five and in others for eight months. In unsterilised sewage the bacillus only survived for three weeks, but it was recoverable for a period of eight months after addition to the same sewage sterilised. There was no material alteration in the characters of the bacillus in the course of these experiments. After six months' existence in sterilised water and eight months' existence in sterilised sewage the bacillus retained all its original characters, except some slight impairment in its power of indol production. The addition of nitrate of potash to unsterilised water diminishes the duration of life of the bacillus in such water, but if the water be first sterilised no such effect of nitrate addition is observable. The admixture of diluted urine with unsterilised water appears to favour the continued existence of B. coli. There is always a difficulty in estimating how far results obtained in such laboratory experiments coincide with the actual facts in natural conditions where the waters are subject to alterations which are not reproduced in the laboratory. This is recognised by the author of this paper, for he concludes with the remark that by the time B. coli had ceased to be recoverable from the water samples most of the water bacteria present originally had also died out. The waters selected for experiment were four in number, three of these being upland surface waters and the fourth a river water. Their chemical composition is stated and indication is also given as to their bacteriological purity.

Analogous experiments upon well waters are published by Thresh and Strachan (*Public Health*, vol. xvii. No. 9, p. 594, June 1905). These observers indicate that it is possible to draw from the bacteriological examination of well waters useful inferences as to the source and period of pollution. It was shown by the previous experiments of Thresh and Sowden (*Public Health*, May 1904) that when one part of crude sewage has been added to one million parts of water, the B. coli communis and the B. enteritidis sporogenes can be detected in the

recently polluted water. The present investigation was directed to the determination of the question whether such pollution could be detected if it were not of very recent date. In their first series of experiments a well water drawn from the tap and filtered through a bacterial filter was used. Crude sewage obtained at a main sewer outfall was added to this water in the proportion of 1-100,000, and the mixture was kept in the dark. The observers omit to state the temperature at which the mixture was kept, a somewhat important detail, but they give the chemical analysis and the bacteriological condition of both the sewage and the tap water. The mixture was examined at intervals with the following results. The numbers of B. coli and of the spores of B. enteritidis decreased, and on the fourteenth day the former could not be detected in 36 c.c. nor the latter in 500 c.c. of the mixture. On the other hand, the number of colonies of bacteria growing on gelatin plates increased up to the ninth day, if not afterwards. The evidences of pollution of the water may be summed up as follows: for the first six days the presence (in small quantities of the water) of the two specific organisms; for the first nine days the presence of B. coli and of an excessive number of bacteria capable of liquefying gelatin; thereafter the excessive number of bacteria alone indicated the previous pollution. A second series of experiments, using the same water but unfiltered, and a more impure sewage, but still in the proportion of 1-100,000, gave similar results so far as the disappearance of the specific organisms is concerned. The number of organisms capable of growing on gelatin increased up to the conclusion of the experiments on the fifteenth day. A third series of experiments dealing with a pollution of 1-1000 showed at the twenty-sixth day that B. coli could be detected in 36 c.c. of the mixture, that B. enteritidis sporogenes was present in 350 but not in 150 c.c. of the mixture, and that the number of bacteria was excessive, each c.c. containing several thousand organisms.

The utility of these and similar experiments was demonstrated to the authors by a subsequent instance. The water from a certain deep well was found to contain a very excessive number of bacteria, yet to be free from B. coli in a sample of 36 c.c. Evidence of the presence of B. enteritidis in the water was found on examination of a sample of 150 c.c. The inference from these results is that the water supplying the well is polluted at a point at such a distance from the well that a period of several days elapses before the polluted water reaches the pumps. During this interval B. coli disappears, but the other indications of the pollution remain. Probably also the

pollution is entering through some fissure, and the water is traversing fissured rocks, otherwise the bacterial flora would not be so abundant.

The effect of delay in the consumption of polluted drinking water is to afford time for automatic purification. London water-supplies are reported upon by Houston (Thirty-third Report of the Local Government Board, Rept. Medical Officer, 1905), and in this connection he points out that the raw London waters are commonly stored for a long time before being filtered, and that "delay" of this kind in transferring water from a river to the consumer might conceivably act not only mechanically and extrinsically, but also so as to produce modification of the originally objectionable biological attributes of the crude waters. The coli-like microbes obtained from London waters after such delay and after filtration are far less typical than those found in human fæces, in sewage effluents, or even in raw Thames water.

ANÆSTHETICS

By D. C. A. M'ALLUM, M.B.,
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Report of the Special Chloroform Committee of the British Medical Association.—The fourth report is published in the *British Medical Journal* of July 22. The substance of the report indicates a continuation of the work done in 1904, and for reasons mentioned it is incomplete at the time of publication.

Professor Sherrington and Miss Sowton report upon the relative effects of chloroform upon the heart and other muscular organs. Voluntary muscle, the blood-vessels of the limb, and the muscular wall of the intestine were carefully studied in their reactions to chloroform dosage, and the results compared with those already obtained in the case of the cardiac muscle. Voluntary muscle showed a close resemblance to the behaviour of cardiac muscle, but the latter was much the more easily affected. A dose of chloroform which produced no obvious depression of voluntary muscle produced a marked depression and ultimate extinction of the cardiac muscle. It was also found that voluntary muscle dosed with chloroform in blood showed much less toxic effect than when the chloroform was administered in an artificial circulating fluid.

With regard to the blood-vessels of the limbs, it is shown

that chloroform in percentage strengths of 0.1 and 0.2 administered in a mixture of equal parts of blood and saline produces a short-lasting constriction of the vessels. With higher percentages this constriction is followed by a dilatation which may persist for a long time.

The experimenters state that for the blood-vessels of the limb, vessels of skin and muscle, to be influenced to any degree, the concentration of chloroform in the circulation has to be so much higher than the point which suffices seriously to depress or even abolish the cardiac action, that, as a practical question in chloroform anæsthesia any influence of the drug on the limb vessels may be disregarded. Also that the action of chloroform on the limb vessels neither causes contraction nor contributes to the fall of blood-pressure which occurs under chloroform anæsthesia.

The experiments upon the intestinal muscle agreed generally with those on voluntary muscles and on the limb vessels.

The second part of the report includes the work of Vernon Harcourt upon chloroform in inspired and expired air. Owing to great manipulative difficulties the report is incomplete, but the following general conclusions were drawn. From the outset more than half the chloroform taken in with inspiration is breathed out again. As administration proceeds, the proportion in the expired air approaches that of the inspired. If a reduction be made in the amount of chloroform administered, immediately the amount expired becomes larger than that inspired. Beyond these points the experimenter at present does not go.

Vernon Harcourt states in his report that he has perfected the pattern of his own inhaler which he employed in carrying out his investigations; by slight modifications and additions the deficiencies of the apparatus have been abolished.

Surgical Shock and Collapse.—Lockhart Mummery in the Hunterian Lectures (*Lancet*, 1905) treated this subject very fully, with special reference to the physiology and treatment of the condition. Shock is defined as a condition due to fall in blood-pressure resulting from exhaustion of the vaso-motor centre, and collapse as a similar condition caused by hæmorrhage or paralysis of the vaso-motor centre.

The anæsthetic is said to play an important part in the causation, especially in the case of chloroform, while the CE mixture and ether are much less liable to produce this condition. In the matter of treatment, stimulants, more especially strychnine, are absolutely contra-indicated, in that they tend to increase rather than diminish any existing shock. Abdominal

compression, either manual or by means of a binder, is of good service, but intravenous injection of saline is disappointing, owing to the effect being only fleeting. On the other hand, saline when introduced intra-abdominally is useful.

In the matter of drugs administered hypodermically, adrenalin, ergot, and hemisine promise well as their effects are established experimentally, though clinically undeveloped as yet. Cocainisation of the large nerve trunks is advocated as a useful measure of prevention.

Malcolm (*Lancet*, 26th August 1905) criticises Mummery's views very strongly and advances opinions as to the conditions of shock contrary to those generally held.

He insists that the essential feature and cause is constriction of the vessels, not dilatation, and brings forward much apparently irrefutable evidence in support of his views. He denies that a fall in blood-pressure absolutely indicates that the vessels are dilated. According to his theory the vascular constriction starts in the smallest vessels and, if the cause producing shock last, advances steadily to the larger, thus driving the blood into the abdominal veins, where it is dammed up. The pulse cannot be felt, simply because the vessel is so tightly constricted that no blood can enter it and therefore there is no pulsation.

There can be no question that Malcolm has a very large clinical support for his views, unorthodox though they may appear.

The Danger of Chloroxycarbonic Vapours in the Administration of Chloroform.—This subject is treated by Arnaud and Bertier (*Revue de Chirurg.*, juillet 1905). The authors give a short account of previous articles upon the dangers resulting from the administration of chloroform in the presence of naked lights, referring specially to the views of Maurange and Schumburg. The well-known irritative effects of the clinical products resulting from combustion in presence of chloroform vapour are described, and the clinical fact pointed out that the patient himself is not as a rule affected, probably on account of the anæsthetic action of the chloroform he is directly inhaling. This very fact, however, is dangerous, in that the patient may easily absorb a possibly fatal dose of the toxic vapours without giving any warning.

The authors, supported by certain clinical facts and experiments performed by them, draw the following conclusions :—

1. That the combustion of lighting gas in the presence of chloroform vapour produces toxic gases which in sufficient amount are rapidly fatal to animals if the surroundings be restricted.

2. That these toxic gases manifest themselves as whitish vapours, intensely irritating to the respiratory system.

3. That the toxic element is not carbonic oxide, but phosgene gas ($COCl_2$), as stated by all previous investigators, which acts upon the blood by virtue of its own toxicity, and not by chemical resolution, into hydrochloric acid and carbonic oxide, as stated by Schumburg.

Léon Imbert has a note on the same subject in the *Gazette des Hôpitaux*, No. 62. He gives the following interesting formulæ. In presence of air and sunlight, chloroform is easily decomposed into oxychloride of carbon and hydrochloric acid—

$$CHCl_3 + O = COCl_2 + HCl.$$

By contact with air, carbonic oxide may also be formed—

$$CHCl_3 + O = CO + HCl + Cl_2.$$

The latter is a particularly significant reaction.

Delayed Chloroform Poisoning.—Guthrie (*Lancet*, 26th Aug. 1905) again expresses his belief that a pre-existing fatty condition of the liver is the real cause. He refers to the article by Drs Brackett, Stone, and Low, where they describe a fatal condition occurring after ether administration, and presenting practically the same clinical and pathological features as those found in chloroform poisoning. Apparently it is the author's view that since two totally distinct anæsthetics like chloroform and ether can produce practically the same clinical and pathological effects, there must necessarily be some common physical condition capable of being acted upon.

With a pre-existing fatty liver the anæsthetic—whether ether or chloroform—may act either by altering metabolism and setting free noxious acids derived from the fat in the liver and perhaps elsewhere, or by increasing the existing liver fat through diminished oxidation, such fat being attacked chemically by intestinal bacterial toxins and being split up into various acid precursors of acetone. The rapidity with which the condition often comes on is also advanced as inexplicable, except on the basis of an already existing fatty liver; and further, that a variation in the amount of liver fat will explain these cases where an anæsthetic had already been administered without ill result. Idiosyncrasy and susceptibility as causes are dismissed as explaining nothing. Some remarks upon prevention and treatment of the condition conclude the article.

Scott-Carmichael and Beattie (*Lancet*, 12th Aug. 1905) report a case of interest. The clinical features were not quite typical, but the pathological lesions, which are fully detailed, are similar to those described by Stiles and M'Donald (*Scot. Med. and Surg. Journal*, Aug. 1904). The authors are able to put aside sepsis and other possible factors, and are driven to fall back upon idiosyncrasy as the only possible explanation.

Ethyl Chloride.—The opinion appears to be increasing that ethyl chloride is a much more treacherous anæsthetic than was at first expected. At a recent meeting of the Society of Anæsthetists, a paper was read by Chaldecott in which he referred to the dangers of the drug. He deprecated its use in dental cases where nitrous oxide would be sufficient, emphasised the fact that it is by no means an absolutely safe anæsthetic, and stated his opinion that ether preceded by ethyl chloride is not so safe as "gas and ether."

M'Cardie (*Lancet*, 7th Oct. 1905), who may be fairly regarded as the pioneer of ethyl chloride in this country, writes very strongly on the same subject. He gives details of several fatal cases, and declares that, in view of the undoubted dangers, the rapidity with which they may occur, and the necessity for immediate restorative measures, ethyl chloride should not be administered by other than qualified medical men.

According to the author, the dangers would appear to be respiratory, the respiration failing before the circulation. The blood-pressure is certainly lowered, and cyanosis and asphyxia may be produced by a too concentrated vapour.

The after-effects may be severe, the most serious being collapse and excessive vomiting, both being much more common than generally stated.

Like Chaldecott, M'Cardie expressly advances his opinion that nitrous oxide, by the continuous inhalation method if necessary, should be preferred to ethyl chloride in dental cases as a matter of routine.

In conclusion he uses the following very plain language: "The pendulum of fashion has now swung too far in favour of ethyl chloride, and as it is our duty to produce anæsthesia with the least physiological disturbance to the patient, we must see to it, in view of the number of deaths and the oft-times severity of the after-effects, that ethyl chloride shall not be administered without good reason, and should use our influence to prevent its use by those unqualified in the practice of medicine and surgery. It is still the duty of the anæsthetist to choose his anæsthetic, thinking first of the safety of the patient."

T. D. Luke (*Internat. Clinics*, vol. iii.), in an article upon ethyl chloride, gives particulars of eight fatal cases.

He has informed the writer that up to the present he has collected some twenty fatal cases, fifteen with details and five incomplete. These he hopes to publish in due course.

Among other articles may be mentioned one by Daniell (*Lancet*, 21st Oct. 1905), giving a careful and detailed account of 100 administrations of ethyl chloride alone, and with nitrous oxide; another by Miss Murray (*Lancet*, 25th Nov. 1905), advocating the use of ethyl chloride as an anæsthetic for infants; and a pamphlet by Barton, in which a method is described for the continuous administration of ethyl chloride in such cases as operations upon the throat and upper air passages where chloroform is not advisable as an anæsthetic.

Local Anæsthesia.—A large number of articles, chiefly continental, have appeared advocating the use of stovain.

Sinclair, however (*Journal Cut. Dis.*, N.Y., 1905, xxiii.), sounds a note of warning that its use may be followed by gangrene of the skin.

Hirschmann (*Detroit Med. Journal*, 1905, v. 118) has an article on sterile water as a local anæsthetic.

New Books and New Editions

Essentials of Human Physiology. By D. Noël Paton, M.D., B.Sc., F.R.C.P. Ed., Superintendent of the Research Laboratory of the Royal College of Physicians of Edinburgh, Lecturer on Physiology, School of Medicine of the Royal Colleges, Edinburgh, formerly Examiner in Physiology in the University of Edinburgh. Second edition, revised and enlarged. Edinburgh and London: William Green & Sons. 1905.

What we said about Dr Paton's Physiology for veterinary students we can say even more strongly of his Human Physiology. There is the same clearness of exposition, the same statement of what is known on a subject and what is not known on it, and, finally, the same admirable combination of theory with practice which is the crowning excellence of an educational work. While all is excellent, we may quote as examples the treatment of the Nervous System. He shows among other subjects that the reflexes connected with various groups of skeletal muscles are definitely associated with different levels of the cord, and then proceeds to give in detail the different parts of the cord associated with each reflex, and hence shows how,

by observing the state of these reflexes, the condition of the cord at different levels may be ascertained. Few things are more useful to the student of medicine than such knowledge. The portion dealing with the localisation of functions in special parts of the brain is briefly and lucidly written. The section dealing with the circulation of the blood, especially that part of it where the vaso-motor mechanism is explained, is another piece of excellent exposition. The same is true of the section dealing with respiration. The section on internal secretions, their production and action, contains in a short space all that is known on the subject, and the portion of it dealing with toxication and immunity will give the student the essence of the many books written on the subject. The last part of the book on reproduction is on a par with the others. The student will find that the book fulfils, and more than fulfils, what it claims to be, the Essentials of Human Physiology.

Select Methods of Food Analysis. By HENRY LEFFMAN, A.M., M.D., Ph.D., and WILLIAN BEAM, M.A., M.D., F.I.C. Second edition, revised and enlarged. Pp. 390, with 1 plate and 54 illustrations. London: Rebman, Ltd. 1905.

AS newer and readier methods for the analysis of foods and drugs are constantly being devised, it is necessary that frequent editions of standard works on the subject should be issued. We therefore find that the well-known American analysts, Messrs Leffman and Beam, have brought up to date a second edition of their manual of food analysis.

The many methods devised by the authors to simplify and render more accurate the analysis of foods, and which have been adopted generally by other workers, may even justify the statement which the authors make that "American work is rapidly becoming the leader in food analysis." Certainly an immense number of men are working at this subject in the United States, and the splendid laboratories of the Department of Agriculture at Washington, together with upwards of forty experimental stations kept up by the Government, as well as an innumerable company of workers connected with Boards of Health and Food Commissioners, allows of every problem in analysis to be submitted to prompt and searching inquiry.

Messrs Leffman and Beam have utilised the materials gathered from these various sources, with the result that an eminently practical book has been produced. The processes associated with the names of the authors are described fully, and much new matter has been introduced. Especially interesting are the new methods for the detection of natural colours

used as substitutes for fruit and egg colours and for the readier detection of food preservatives. In the estimation of fat in condensed milk, the recent methods introduced by Leach and Cochran are described.

Altogether the authors are to be congratulated on the production of what will prove to be a standard work, and one which we feel sure will find a place in every well-equipped analytical laboratory.

Appendicitis: Its History, Anatomy, Clinical Ætiology, Pathology, Symptomatology, Diagnosis, Prognosis, Treatment, Technique of Operation, Complications, and Sequels. By JOHN B. DEAVER, M.D., Surgeon-in-Chief to the German Hospital, Philadelphia. Third edition, thoroughly revised and enlarged. Pp. 491, containing 64 full-page plates, 8 of which are coloured. London: Rebman, Ltd. 1905. Price 30s.

THE United States of America is the especial field of Appendicitis. Fitz of Boston was the pioneer who in particular attracted attention in 1886 to the anatomico-pathological explanation of the symptoms, and coined the term appendicitis. Since then there have been innumerable workers in the States, to whom much credit is due for good work done upon the subject, and it is therefore not surprising that two important books should have recently emanated from America which, though differing materially in character, are yet each of the greatest interest to the medical profession. The monumental work on the Vermiform Appendix and its Diseases by Dr Howard Kelly of Baltimore with its exquisite illustrations, is in the text chiefly a compilation from the works of other men. For reference it is probably a unique source of information to the operating surgeon, but from its size and plethora of opinion in each department of the subject it will often fail to guide him in what is just the best thing to do in the individual case or condition. It is an academic work rather than a practical guide, and in this differs from Dr Deaver's work upon Appendicitis, which is the product of personal experience of the subject; experience in quantity probably second to none in the operative treatment of this disease. As a practical work to guide surgeons of less experience than his own, Dr Deaver's work is of the first importance; we have studied this the third edition with intense interest, and believe that others, as in our own case, will find it replete with wise counsel how to act in the manifold difficulties which arise in this common disease. This edition has been so amplified that it differs very much from the second edition, as

may readily be deduced when we observe that instead of 300 pages in the second, and 22 full-page illustrations, we have 490 pages and 64 full-page illustrations.

The chapter on the History of Appendicitis has been written by Dr Ashhurst, while that on Pathology is the work of Dr A. O. J. Kelly. That the work embodies the more recent literature may be judged by references made to Sir William Macewen's paper on the function of the cæcum and appendix (*Lancet*, 1904). The keynote to the pathology is that "ætiologically appendicitis is an infective process," and "the inflammatory manifestations in the appendix may commence acutely or chronically." The pathology is discussed under the headings: (1) the lesions of the appendix; (2) the peritonitis and its consequences; (3) the bacteriology; (4) the pathogenesis. The pages devoted to this part of the work are of much value in elucidating the clinical features of the disease, and in making a strong case for early operation in all cases of appendicitis. The bacteriology of appendicitis, in 286 cases examined showed that out of 128 acute and 158 chronic cases the bacillus coli communis was in pure culture in 72.65 per cent. of the former and in 89.7 per cent. of the latter. Dr Kelly believes the organisms can penetrate the intestinal wall; and that this occurs, especially when the wall is rendered less resistant by inflammatory processes; and that the virulence of the organisms is increased by long-continued constipation or diseased conditions of the bowel wall. In the appendix the chief cause of increased virulence is defective drainage.

Deaver considers there are three cardinal symptoms of acute appendicitis, viz. pain, tenderness, and rigidity of the right lower quadrant of the abdomen. He recognises a distinction between relapsing and recurrent appendicitis. He discusses appendicitis in children, and refers to the importance of rectal examination and alludes more particularly to the importance of differentiating between appendicitis and intussusception. Two sentences in relation to chronic cases may be quoted in their entirety. "We should not rest content with our diagnostic ability until we can say with at least a fair degree of certainty, whether after the abdomen has been opened, anything further can be done to relieve the patient's disease." And "I would therefore give it as my candid opinion, reached after somewhat painstaking consideration of all the questions involved, and with a not very limited experience of all kinds of appendicitis cases, that where no frank, acute attack of appendicitis has ever preceded the chronic symptoms, the surgeon will do well to decline to operate unless the physical examination shows very positively that the appendix is diseased."

Other difficult questions are considered by Dr Deaver in a judicial and lucid manner, as for instance Differential Diagnosis, which occupies 60 pages, and the value of the blood-count in this disease.

Naturally it is of much interest to know what the author's view is regarding treatment, and this part of the work is of extreme value, Dr Deaver stating his opinion in the clearest way possible. It is not necessary to refer to this section of the work in much detail, but we may indicate shortly the views of the author in regard to some points which in the minds of many physicians and even surgeons is debatable. "Provided the diagnosis has been made early and there are no complications that render immediate operation unjustifiable, the best results are obtained by removing the diseased appendix as soon as the diagnosis has been made." "In every case of fatal appendicitis I believe there was a time when operation would have been followed by recovery." "*In every case of appendicitis seen early, operation is indicated regardless of the mildness of the attack and regardless of the severity of the attack (in the absence of a spreading peritonitis).*" This last dictum is put by the author in italics. "Under no circumstances should any one who has once had an attack of appendicitis ever consider himself safe from recurrence, and he should never deprive himself of the facilities for operative treatment."

Another question of much importance to medical men is that of the transportation of patients to a hospital. It is often of paramount importance for the medical man to feel justified in advising that to transfer a patient from his house to hospital is safe. Deaver's opinion is: "I am firm in the conviction that any patient who would be rendered unfit for operation by the careful transportation in an ambulance, which is now almost universally possible in cities of any size, would be equally unfit for operation in his home." Lastly, in referring to the text of this work we would direct attention to the *packing* necessary to protect the general peritoneal cavity from infection during operation, when suppuration is present, pp. 387-388.

In completing our review of this work by Dr Deaver, it remains for us to say that it is beautifully illustrated, and the author's methods are brought very vividly before us, both in the text and in the illustrations. A surgeon who has operated on several thousand cases of appendicitis is well entitled to state his views in no uncertain way, but the author of this work does so in such a manner that one feels compelled to implicitly trust his opinion. This work is that of a great surgeon—a master—and should be carefully studied not only by the operating surgeon, but by all medical men.

Anatomy, Descriptive and Surgical. By HENRY GRAY. Sixteenth edition. Edited by T. PICKERING PICK, F.R.C.S., and ROBERT HOWDEN, M.A., M.B., C.M. London: Longmans, Green & Co. 1905. Price 32s.

A WORK which has reached its sixteenth edition may be said to be beyond the field of criticism, in fact, Gray's "Anatomy" has long been part of every medical student's mental food. So widely is it used that the present—the sixteenth edition—has followed the last edition within some four years. In the present issue much of the text has been either rewritten, or revised, and many additional drawings have been introduced, more especially in connection with the chapters on Embryology, the Nervous System, and the Organs of Sense. Whilst many of these drawings are much to be commended, they are not of equal merit, and there is a tendency to pander to the public in the shape of an increasing number of coloured illustrations. Coloured anatomical illustrations are very much the fashion just now, and are a direct incentive to the study of anatomy by the fireside, instead of in the dissecting-room. We are sorry to see that in the present edition, as in the last, the antiquated description of the thoracic aorta is still adhered to. Surely an anatomist of Professor Howden's calibre should know better than to describe anterior and posterior relations of the arch of the aorta.

Putting these, perhaps minor, blemishes on one side the book is still, for a student, the most serviceable book on the market.

The Treatment of Fractures. By CHARLES LOCKE SCUDDER, M.D., Surgeon to the Massachusetts General Hospital. Fifth edition, thoroughly revised, with 739 illustrations. Philadelphia and London: W. B. Saunders & Co. 1905.

THIS is the fifth edition of Scudder's "Treatment of Fractures." The mere fact that it has gone through so many editions is evidence enough of the high appreciation in which it is held. It is a handsome volume and is only slightly larger in bulk. This increase in size is mainly caused by additions to the illustrations, which now number no less than seven hundred and thirty-nine. The new figures, which include several excellent skiagrams, are all of importance as illustrating special types of injury or treatment, and are reproduced with the same artistic quality of tone. They add to the value of the book. As regards the text, the alterations are slight in character, and it is unnecessary to add further to the review which appeared comparatively recently in these pages on a former edition. The

chapter on the use of plaster of Paris is, however, worthy of special notice, and gives many useful practical hints on the use of this material for immobilising fractures.

The new edition of this well-known work can be confidently recommended as one of the best books on fractures and their treatment.

Atlas of Pathology. Fasciculus xiv. (double number). Framboesial Syphilis (Yaws and Parangi). Pp. 24. Plates A. to H. and lxxv.-xci. By JONATHAN HUTCHINSON, F.R.C.S.Eng., F.R.S., etc., London. The New Sydenham Society. H. K. Lewis.

IN the letterpress forming the first part of this Fasciculus, Mr Hutchinson discusses the Clinical and Pathological characters of Yaws (Fiji) and Parangi (Ceylon), compares them with those of Syphilis, especially of framboesial type, and also indicates that the disease is most probably allied to, if not identical with, that denominated "sibbens" or "sivvens" in Scotland, and "button-scurvy" or "morula" in Ireland. He shows that similar manifestations are to be met with in all these diseases, adducing strong arguments in support of his contention that they cannot be distinguished from one another.

"To my mind it seems most probable that the virus—as yet undemonstrated—which causes these affections is one and the same, and that it has had its homes, from times long antecedent to medical history, in various parts of the world. Amongst these were the West Coast of Africa, the West Indian Islands, Fiji and other islands in the Pacific, China, and possibly India. It was not known in Europe until the end of the fifteenth century, when it was introduced by Portuguese traders from West Africa. Almost simultaneously, but a little later, it was also brought over by Columbus' sailors from the West Indies. It then spread over Europe as 'the Neapolitan disease,' 'the French disease,' and finally as 'Syphilis.'"

The letter-press is fully illustrated by both black-and-white and coloured portraits.

The second part of the Fasciculus is made up of coloured plates, fully illustrating the diseases in Ceylon included under the term "Parangi." These were prepared under the supervision of the late Sir William Kynsey, C.M.G., who furnishes descriptive remarks. From them a very complete and accurate knowledge of the condition can be gained.

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SOME NOTES ON HÆMORRHAGE FROM THE MIDDLE MENINGEAL ARTERY

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HÆMORRHAGE from the middle meningeal artery is an accident of great importance; for although in typical cases the diagnosis is an easy one, the results of treatment are not, so it seems to me, as satisfactory as they might be and perhaps ought to be. And in the other cases the diagnosis may be one of extreme difficulty, indeed it may happen that every known symptom indicative of such a hæmorrhage is absent, so that an absolutely accurate diagnosis is impossible.

It may be worth while to recapitulate some of the facts known regarding these injuries, and to refer to some points which have appeared to be of importance, my experience being derived from fifteen cases that have been under my own care.

Mode of Origin.—In the majority of cases wound of the meningeal artery is brought about in consequence of fracture of the skull, and this, naturally, more certainly damages the vessel when it involves the canal in which it frequently runs at the anterior inferior angle of the parietal bone. The canal occurs with variable frequency, Steiner (1) having found it to be present in 38 per cent., and Plummer (2) in 60 per cent. of the skulls which they examined.

It may, however, be injured without any fracture of the skull bones. Jacobson (3) in his most admirable paper refers to four cases of this kind (Nos. 2, 3, 8, and 10; in Nos. 2 and 3 death occurred rapidly, and post-mortem examinations were

made, and no fractures found; in No. 8 the patient recovered after operation, and proof that no fracture of the skull existed is wanting; in No. 10 there may have been a fracture, but as the post-mortem examination was made a considerable time after the injury, it is uncertain). Again, it is quite certain that the vessel may be torn at a long distance away from any fracture of the skull, and often on the side opposite to that which is fractured; in two of my cases this happened, and Weismann (4) refers to four such cases (Nos. 35, 53, 118, and 119 of the series collected by him), injury by contre-coup as it might be termed. Then, again, cases of double meningeal hæmorrhage have been met with, rupture occurring on one side usually along with a fracture, and on the opposite side without any—as in the celebrated case of J. Hill (5) of Dumfries, who, in 1757, trephined a patient on both sides and evacuated a blood clot from each side, and so saved his patient.

Weismann refers to three cases in addition to that of Hill (Nos. 39, 132, and 138).

The explanation of these cases of rupture of the artery without fracture, probably, is that owing to the violence applied to the head the elasticity of the skull permits a rapid alteration in its shape, while the dura mater, less elastic than the bony case, does not react so quickly, and gets lacerated in consequence. I have twice now at post-mortem examinations in cases of head injury seen the dura mater lacerated at a spot far removed from any fracture in the bone, and where the latter could not by any possibility have caused the laceration, and which could only have been produced as the result of a bursting action; but the dura may be lacerated directly by the bone in immediate proximity to the injured artery, and this is a factor of importance in connection with the resulting extravasation of blood, for in a case where there is no question of injury to sub-dural vessels it may permit blood which would otherwise be located outside the dura to escape into the sub-dural space and in that way modify the symptoms which result, so that the typical sequence of signs is awanting and the diagnosis rendered obscure in consequence. This particular type of meningeal hæmorrhage has been termed by Marchant (6) the "épanchement en bissac."

The dura mater is very closely adherent to the internal

aspect of the skull, but not equally so all over. Marchant describes a "zone décollable" and "adherente"; the former extending from behind the margin of the small wing of the sphenoid to 2 or 3 c.m. from the internal occipital protuberance, and from either side of the falx cerebri to a line extending from the margin of the orbito-sphenoid to the upper limit of the lateral sinus, the "zone adhérente" being below this level. It seems to me that this is not quite an accurate description, the really adherent zone being practically in the middle line, over the basi-sphenoid and sella turcica and the region of the cavernous sinus and Gasserian ganglion, and forwards along the cribriform plates; while laterally it extends out over the petrous bones; elsewhere at the base the dura strips easily enough.

The force necessary to strip the dura off the bone is very great. Bergmann estimated it at from 80 to 100 mm. Hg., but it is probable that as the result of the changes in shape of the skull in consequence of the application and cessation of the violence, a certain amount of separation between the two structures occurs, as was shown originally by Sir Charles Bell. Once started, and the escape of blood from the artery continuing, it acts very much on the principle of the Brahmah press and strips the dura still more, until either thrombosis occurs or the pressure inside and outside the artery is equalised.

The vessel may be injured in any part of its course. I found in my fifteen cases that the trunk was injured three times, the anterior main branch five times, the posterior branch three times, and in four cases there was just an ooze from small branches. The amount of blood extravasated varies considerably in these cases; Jacobson puts the average at about 2-3 ounces, but it may be as much as 6-9 ounces. It forms in ordinary cases a thick black cake which fractures with a peculiar granular appearance; but in cases where there is an opening in the skull through which it can escape, the blood will form a subcutaneous hæmatoma, and, if there be a scalp wound as well, will find its way to the surface.

Krönlein (7) has classified the intracranial hæmorrhages from this artery as (1) diffuse and (2) circumscribed, and the latter he further subdivides into fronto-temporal, temporo-parietal, parieto-occipital, and in a later paper he described an occipital type—the only case of the kind known to me. In

this Journal of April 1904, I described a case of "sphenoidal" hæmorrhage, the clot being situated over the left great wing of the sphenoid bone and confined to the base of the skull.

The result of the extravasation of blood is that in almost every case where it produces symptoms, and these are not relieved by surgery, the compression of the brain so brought about is incompatible with life. It is possible that in some few instances the patient recovers without operation, but this is an infinitely rare occurrence; probably in such instances the extravasated blood is absorbed. Weismann quotes one case, No. 127 of his series, to show that such absorption does occur; but it can never be relied upon, and in any case to leave a blood clot like this involves a very great risk; for if the patient survives the dangers of the severe compression he still runs the risk of infection taking place with all the dangers of this most serious complication. Hueguinin (8) has recorded a case where a meningeal clot became infected where there was no wound or abrasion of the scalp, and where the infection was probably carried by the blood stream; but encapsulation of an extra-dural clot may occur as described by Häbler (9), who met with one in this condition six months after the injury had taken place.

A traumatic aneurism may form as the result of injury to the vessel, as happened in a case recorded by Gamgee (10), in which the blood had escaped from the interior of the skull and formed a pulsating swelling with a distinct bruit in front of the ear.

Symptoms.—In a typical case of uncomplicated hæmorrhage from the meningeal artery the symptoms may be grouped into three stages (1) of concussion, (2) of consciousness, (3) of compression of the brain, this latter being at times associated with signs of localised pressure on the brain.

The cardinal sign is the period of consciousness, the so-called "lucid interval," but unfortunately it is not always present, or at least a history of its occurrence is not forthcoming. It was mentioned as having been present in thirty-two out of sixty-three cases collected by Jacobson, and in one hundred and three out of one hundred and eighty-seven cases collected by Weismann, so that their figures agree fairly closely (50-55 per cent.).

In my fifteen cases the typical sequence of symptoms was only present in one case, while eight of the patients had been unconscious all the time on from the occurrence of their accidents, as far as our information went. It is not remarkable that in many cases there is no evidence of a lucid interval, for it may be of only very limited duration, and it continually happens that no one has been present to see it. Analysis of Weismann's series of cases shows that its average duration varies from fifteen minutes to four days, and no doubt this actually depends upon the rate at which the blood is extravasated in any given case, and this, in turn, upon whether the rupture involves the trunk of the artery or one of its main branches or only the smaller ones. The rate of extravasation is doubtless further influenced by the state of the patient after the injury, whether restless or quiet, and upon the administration or withholding of alcohol.

The explanation of the lucid interval is, I take it, that during the period of concussion little or no blood is extravasated owing to enfeeblement of cardiac action, clotting very probably occurring in any blood that is primarily extravasated, so that the vessel is sealed until such time as the cardiac force, with the returning consciousness and reaction, becomes sufficiently powerful to "force" the vessel and to cause further extravasation and stripping of the dura off the skull.

Kocher, however, explains it by the theory of the establishment of a "stage of complete compensation," and believes that, with the rise of intracranial pressure due to the bleeding, the cerebral veins, being the least resistant structures, are compressed, and that, in consequence of this, the arterial pressure is increased, and this, in turn, maintains the cerebral circulation; and, as a result, cerebral functions continue to be carried out. I am unable to follow this most distinguished surgeon in this, for it appears to me that the same increase of arterial pressure which this theory supposes will maintain cerebral activity, will also make itself obvious in the meningeal artery, and if so, that its effect would probably be to shorten the period of consciousness, if not to abrogate it altogether.

Absence of the lucid period may be explained by one of the following conditions: (1) Intoxication of the patient, or (2) the violence being so severe that compression is brought

about at once, and this I believe to be usually due to immediate and direct injury to the brain or the vessels within the dural cavity, or else to bursting of the dura mater at the time of the accident, so that blood is permitted to escape directly into the subdural space (épanchement en bissac), which is possibly an easier route for it than when it has to strip up the dura off the bone, the latter acting at first as a "brake" to the rapidity of extravasation. But in some rare instances it may be due to such an extensive separation of the dura occurring at the moment of application of the violence that effusion of blood takes place with extraordinary rapidity. Lastly, it is possible, perhaps, that in some rare instances it is due to extensive depression of bone causing compression symptoms from the beginning.

On the other hand, there are cases where the primary concussion stage is followed by a conscious period; but at any rate, up to the time a patient is treated surgically no compression stage sets in. This may be due to the escape to the exterior of blood through a fracture and wound of the scalp, as happened in one of my cases (No. 9); or it is conceivable that it might be due to the escape of cerebro-spinal fluid, which would afford relief to the intracranial tension.

And again, the primary stage of concussion may be absent, and the patient remain conscious from the time of the receipt of the injury to the manifestation of the compression. This happened in fifty-two of Weismann's cases.

Lastly, there may never be any stage of concussion or of compression: a patient may remain perfectly and absolutely conscious all the time. I have never met with a description of this type of case, but the following notes of a patient who was under my own care will illustrate this rare condition of affairs.

CASE I. J. M., æt. 21. Admitted Glasgow Royal Infirmary, June 7, 1902, having been struck on the head by a heavy weight.

He was bleeding from the left ear and both nostrils; was perfectly conscious. There was complete paralysis of the left side of the face, but none elsewhere. He vomited a arge quantity of blood at night.

On the following day he complained of pain at the back of his head; a large amount of reddish fluid has been coming from left ear, necessitating constant changes of dressing. The left membrana tympani is ruptured; and hearing, both by bone and air conduction, is lost on the left side. Optic discs normal.

Temperature, 99° F.; pulse, 92; respiration, 24.

June 10.—There is no change in his condition, no paralysis, and the patient is perfectly clear and sensible. Still a very copious discharge of fluid, now clear, from left ear. At night his temperature was 100° F., but at 4 A.M. on June 11 it had risen to 103° F., while the pulse was 96 and respiration 20. Shortly after this he became very restless, and two hours later (at 6 A.M.) he was unconscious, and he died at 7 A.M., June 11, temperature just before death being 103.4° F.; pulse, 136; respiration, 16. Post-mortem examination limited to the head: a large extra dural clot from the posterior branch of the right middle meningeal artery at the posterior part of the parietal lobe; very slight laceration of the orbital surface of the left frontal lobe of the brain, and a very little blood around it. No other injury to the brain. An early basal leptomeningitis, limited to the posterior fossa. A longitudinal fissure of the left side of the base of the skull, crossing the left petrous bone, and which had divided the left seventh and eighth nerves.

In many cases there is evidence of localised pressure on the brain, shown in the majority by contralateral paralysis. Where this is present it is a sign of the utmost importance and value in enabling one to form a diagnosis; but it is uncertain, and in a very large number of cases we have to get on without its aid and to depend on other signs. In many instances where this important piece of evidence is awanting it is very probable that it is so because the patient has not been looked after by skilled attendants. There are not many conditions where skilled observation plays so important a part in diagnosis, and therefore of treatment, as in "head cases." It is certain that for want of it much valuable information is often lost; localised paralysis may have been present in a case, but because no one sees it, or knows to look for it, it is missed, and when a surgeon sees the patient there is paralysis in all four limbs. Nothing is

more essential in surgery for diagnostic purposes than that a patient who has been knocked unconscious as the result of a head injury, should be watched from the beginning by a competent nurse.

In my fifteen cases contralateral paralysis of the limbs was present four times; in one of the remaining cases there was a deficiency in action of the muscles of one side of the face, in another there was general paralysis of all voluntary muscles, while all the other patients were able to move all their limbs either spontaneously or after irritation, and showed no local paralysis.

Weismann found contralateral paralysis noted in sixty-five of the cases of his series, in fifty-three of which both upper and lower limbs were involved; in seven, only the upper limb; in three, only the face; and in one, the arm and face. He did not find any case recorded which manifested an isolated paralysis of one lower extremity. In sixteen it was noted that paralysis was absent.

Jacobson writes that mention of the state of the limbs was made in thirty-seven of his collected cases, and that there was "more or less hemiplegia" in nineteen of them.

Although in the great majority of cases of meningeal hæmorrhage with paralysis, the side of the body opposite to that of the clot is the one affected ("contralateral" paralysis), cases have been described where the paralysis and hæmorrhage were on the same side of the body ("collateral" paralysis), but the explanation of these cases is not at all clear. I have published a case of this nature in this Journal for November 1904.

A sign of some importance, as it may have a diagnostic value, is the state of the pupils. It is not uncommon to find some inequality in the size of the pupils, and it has been suggested that this is due to involvement of the third nerve or of the sympathetic nerve inside the skull, but it seems more probable that it is due to a cortical cause. Pagenstecher found experimentally that with a slight degree of intracranial pressure the pupils narrowed, but became dilated as the pressure was increased.

One is perhaps rather too much inclined to pay attention clinically to the wider of the two pupils in cases where inequality exists. I think that the reaction of the pupil is at

least as important a point to be noted as the inequality; I have recently seen a case of subdural hæmorrhage in which one pupil was wide and reacting freely, the other small and not reacting, and the hæmorrhage was on the side of the small pupil. In my cases of meningeal hæmorrhage the state of the pupils was as follows: in six there was inequality, and in all of these the wide pupil was on the side of the hæmorrhage; in one of these both pupils were active to light, in the other five the two pupils did not react. In five patients the pupils were equal and active; in two they were equal but did not react to light; in two there is no note as to the state of the pupils.

Sensory disturbances have not been seen often in these cases; probably sensation is not in abeyance, even though the power of motion is lost; for a patient who is completely unconscious will often try to remove an offending object from a paralysed limb with the good hand; but Weismann refers to one case in which it was noted that hyperæsthesia was present. I have not been able to find any case recorded in which aphasia was seen as the result of compression of the brain. Bleeding from the ear in my experience is not common in these cases, and is not a sign of any clinical value when it does occur; for it was only present in three cases out of the fifteen, and in two of them was from the ear of the side opposite to the site of the meningeal clot. Five of the patients had some bleeding from the nose, but the remaining seven did not bleed from ears, or nose, or mouth.

Pulse and respiration are affected according to the state in which the patient is seen, *i.e.* they correspond to the concussion or compression stages.

The bladder and rectum are affected very uncertainly; incontinence of fæces is common; there may be retention of urine, or it may be voided spontaneously though unconsciously.

Diagnosis.—Where the typical sequence of symptoms is met with, diagnosis may be easy enough, but without the history of this sequence, and with no history or evidence of injury, it may well be difficult. One has to eliminate the purely medical conditions that bring about a state of coma, and particularly one has to discount that due to alcohol; I shall not do more in this connection than draw attention to the great value of the "Macewen" pupil in alcoholic coma—a pin-point-pupil until

the patient is disturbed, when it dilates, to become contracted again when the individual is left to settle down.

Among the conditions resulting from trauma in which difficulty may arise there are (1) laceration of the brain, (2) hæmorrhage into the subarachnoid space, (3) hæmorrhage from a dural sinus. Without exploration it may be impossible to diagnose the latter.

Laceration of the brain and hæmorrhage into the arachnoid space may at times produce a condition of paralysis of one side of the body rather greater than that of the other, and so simulate a case of meningeal hæmorrhage with advanced compression. Speaking generally, and quite admitting it is by no means an absolute law, it seems to me that in the two former paralysis is more apt to be general from its beginning than in cases of purely extradural hæmorrhage, though the latter will, if not relieved by surgery, quickly cause general paralysis ; it is the combination of extra with subdural hæmorrhage that gives rise to difficulty, for the general paralysis of the latter masks the localised of the former. Thus Jacobson has published in his collected cases, one (No. 78) in which an injury causing arachnoid hæmorrhage produced concussion followed by a very clearly marked "lucid" interval in which the patient was able to carry on his regular work for two or three hours, and then became insensible again, and was admitted to hospital suffering from compression of the brain, but had no localised paralysis, and after death it was found that a "large quantity of semi-coagulated dark blood occupied the cavity of the arachnoid." However, it is probably unusual for such a very definite history as this of a lucid interval between concussion and compression stages to be obtained ; but the association of subdural with extradural hæmorrhage is not uncommon. Thus I find that in eleven of my cases there was, in addition to the meningeal clot, a subdural extravasation with or without laceration of the brain ; in nine this was verified by post-mortem examination ; in the other two, although it was not verified, it is absolutely certain from the symptoms, the complete paralysis and rapid death in spite of removal of the extradural clot by operation, that it was present.

One might perhaps think that in cases of laceration of the brain without extensive hæmorrhage, or at least where the

hæmorrhage is not progressing, irritative phenomena would be prominent features, in the early stage at least, but it is frequently not the case; in the majority of instances probably the basal aspect of the brain is alone affected and the patient lies profoundly unconscious; and though for a time able to move the limbs when they are irritated, eventually passes into a state of complete paralysis.

There is one sign which, when it is present, is always well worthy of investigation, I refer to a hæmatoma of the scalp, especially in the temporal region. This may be a simple condition unassociated with fracture, but it often renders palpation of the skull beneath it so difficult that, even though a depressed fracture be there, it may be missed; in any case it indicates one site where violence has been applied. When a definite hæmatoma is present in a patient profoundly unconscious, and still more if there be definite paralysis, the hæmatoma ought to be incised always, so that the skull beneath it may be examined. In five of my cases a hæmatoma was present and was incised with the result that in four of them a fracture was found crossing the line of the artery and an extradural clot evacuated after trephining; in the fifth case there was no fracture, but a trephining was made and a large *subdural* clot removed.

I wish to draw attention particularly to that type of case in which every ordinary symptom associated with meningeal hæmorrhage is absent, at anyrate until the very last stage when, in consequence of infection, a stage of compression and coma may be brought about. This absence of symptoms arises when there is a free escape of cerebro-spinal fluid from the interior of the skull. In addition to the case described above (No. 1), I saw almost precisely the same sort of thing in another patient (No. 3); for although on admission to hospital he was decidedly stupid and inclined to be irritable, these signs quickly passed off and he remained perfectly clear mentally until the onset of the compression due to the infective process; the first patient, on the other hand, was absolutely clear and conscious all the time, from the receipt of his injury until four or five hours from his death. It is worth noting that in both these cases the clot was from the posterior branch of the meningeal artery ("parieto-occipital"), and was situated on the

side of the skull opposite to that which was the seat of the fracture. I know of no method by which this condition can be diagnosed in such cases other than by exploration, and it may be difficult to persuade a patient in full possession of his faculties to permit himself to be trephined all round the skull on the off-chance of discovering a clot.

In the other class of case where symptoms may remain in abeyance owing to the escape of blood to the exterior through a fracture and super-imposed scalp wound, with reasonable care the fracture would in all probability be discovered and its proper treatment would lead to the discovery of the internal clot.

As showing the extreme difficulty in the diagnosis of these cases it is worthy of note that Krönlein has recorded a case in which he trephined for symptoms, typical of those of meningeal hæmorrhage, which resulted from a fall in which the patient had sustained a fracture of the bones of the leg; no clot was found on operation, and after death it was discovered that the symptoms had been caused by fat embolism of the cerebral arteries. This is probably an extremely rare combination of circumstances: personally I have only seen symptoms brought about by fat embolism in two patients; in each of them there was coma and paralysis before death, but in both the paralysis was general. However, the possibility of fat embolism causing symptoms simulating those of meningeal hæmorrhage ought to be kept in mind, and as operation offers a chance of success should a clot be present, the patient ought to have the benefit of the doubt, for otherwise death will almost certainly ensue whichever lesion be the cause of the symptoms.

Brief notes of the cases which have been under my care are appended.

CASE II. J. C., æt. 36. Admitted May 14, 1893, having fallen 14 feet; was conscious when admitted; no paralysis present; a large scalp wound just to right of middle line on vertex, no fracture made out; some blood in left nostril; no bleeding from ears; pupils medium, and react to light. He became unconscious one hour or so later, and shortly afterwards it was noticed the limbs of the left side were not moved. The pupils remained medium in size and equal, reaction doubtful.

Operated as soon as possible. A fissure was found crossing great wing of right sphenoid, well below level of the scalp wound. Trephined over the anterior branch of the right meningeal artery and a very large extra-dural clot removed. It reached up to the falx and down to base of middle fossa. The anterior branch of the artery was torn opposite the fracture, and was tied.

He died three hours after operation; the brain did not expand at all.

A post-mortem examination was refused.

CASE III. A. G., æt. 31. Admitted July 31, 1896, after having fallen down a stair. Semi-conscious, bleeding from right ear; can move all limbs. Pupils equal, medium, and react freely to light; very restless, but replies to questions. The aural hæmorrhage was followed by a profuse discharge of cerebro-spinal fluid, which lasted twelve days, during which time he remained very well, except that on August 9 he had had severe headache; the right membrana tympani was ruptured, the left intact. The optic discs were normal. On August 12 he became worse, temperature rose to 104° F., left facial paralysis and paralysis of the external rectus of each eye. He died on the 16th August, no further paralysis having developed.

Post-mortem Examination.—A large extradural blood clot over the posterior aspect of left cerebral hemisphere from branches of the posterior branch of left meningeal artery, none on the right side. The anterior pole of the left frontal lobe much lacerated, brain and membranes œdematous, some blood around the lacerated area, and slight basal lepto-meningitis. A fine fissure across right tegmen tympani, running down to right jugular foramen, but no other fracture.

CASE IV. J. A., æt. 29. Admitted September 30, 1896. Fell height of two stories, found unconscious, and has been so since. Moves right limbs, but not the left, on stimulation. Right proptosis with wide stabile pupil; left pupil small. Trephined at once over right meningeal artery (anterior branch), and a large clot found; artery found torn and was tied. At the end of the operation could move left limbs, and

the proptosis had largely subsided. He died a few hours after operation.

Post-mortem Examination.—No further bleeding had taken place. An extensive subarachnoid hæmorrhage all over convexity of cerebrum and laceration of convolutions around the left fissure of Sylvius. The fracture ran down into the right orbital fissure. There was a good deal of blood between the orbital roof and the dura beneath it.

CASE V. E. H., æt. 54. Admitted April 15, 1897, having been injured in a coal pit; was not unconscious, but could give no account of his accident. No paralysis, no bleeding from ears, nose, or mouth. Large scalp wound over right temporal region leading down to a depressed fracture. Operated on two hours after admission, by which time he was unconscious and could not be roused, though he still moved his limbs when irritated. Found blood clot from anterior branch of right meningeal artery, which was tied.

Went out well, June 1897.

CASE VI. J. S. Admitted December 18, 1898, having been injured by a passing train. Unconscious, bleeding from right ear and nose. Pupils equal, medium, and react. Fulness in right temporal region. No subconjunctival hæmorrhage. Right hand and forearm completely smashed. Right scapula and several of lower right ribs fractured. Could move all limbs. Explored hæmatoma, and found fissure across line of meningeal artery. Trephined, and got large extradural blood clot. The hæmorrhage was from small branches; drained; bone not replaced.

Right arm amputated at elbow. Quickly recovered consciousness, and remained well till afternoon of following day, when he became irritable, and temperature began to go up, and he died in evening, temperature 105.6° F.; pulse 156.

A post-mortem examination not permitted.

CASE VII. A. F., æt. 28. Seen December 14, 1900, having fallen about fourteen feet. Unconsciousness, bleeding from mouth and nose, but not from either ear. Paralysis of both left limbs; right pupil medium, left small; both

reacting feebly. Exposed right temporal fossa, and found fissure crossing anterior branch of artery. Trephined, and found large clot; required a second opening posteriorly to evacuate it completely. Artery wounded at foramen spinosum and cavity packed, but bleeding continued. so, December 16, external carotid tied. Recovery.

CASE VIII. T. N., æt. 29. Admitted November 9, 1901. Had fallen in the street the previous day, and had walked home with assistance. Shortly after became drowsy and unconscious. No bleeding from nose, mouth, or ears. He died almost immediately after admission to hospital.

Post-mortem examination limited to head.

Diastasis of both lambdoid sutures; a large extra-dural clot from posterior branch of right meningeal artery, and an extensive subdural hæmorrhage.

CASE IX. T. Y., æt. 32. Admitted November 21, 1901, having been struck on left side of skull. Semi-conscious, but can be roused to answer questions, and can move limbs. Some defect in the movement of right muscles of face. Pupils small, equal, and do not react. Large hæmatoma of left temporal region, over which there is a wound from which dark blood wells up continuously. No bleeding from ears, mouth, or nose.

Exposed bones of left temporal fossa, and found large depressed fracture which had been quite masked by the hæmatoma. Blood welled up freely between the fragments of bone. Removed these, and found large blood clot from anterior branch and extensive laceration of dura and of brain beneath, with subdural hæmorrhage. Wound lightly packed.

Died 24th November.

Post-mortem Examination.—Slight leptomeningitis of left cerebral hemisphere. Granular contracted kidneys, old tuberculous lesions in both pulmonary apices.

CASE X. T. R., æt. 44. Admitted March 9, 1902, having fallen down a stair. Unconscious since accident. No bleeding; general paralysis of all extremities; pupils medium, the right a shade wider than left; slight fulness in right

temporal fossa. Exposed bones of right temporal fossa by incision, and found fracture across line of meningeal artery. Trephined, and evacuated very large blood clot. Anterior branch of artery found torn opposite fracture and tied. He never recovered consciousness, nor moved any of limbs, and died five hours after operation.

Post-mortem examination not permitted.

CASE XI. A. B., æt. 6. Admitted April 24, 1902, having fallen about fifteen feet. Semi-conscious; no bleeding from ears, mouth, or nose; able to move all limbs. Large swelling over left side of head. Fracture felt crossing left parietal, down and backwards. This fracture was exposed by incision, and from it a second (fissure) was found running down and forwards, crossing meningeal artery; trephined over its anterior branch; clot found and removed.

Dismissed June 4, 1902.

CASE XII. M. S., æt. 30. Admitted November 4, 1902, after falling thirty feet. Unconscious; bleeding from nose, and vomited blood; no paralysis; pupils equal, medium, and react. Three days later developed epileptiform seizures, which began in right upper limb. Trephined over left side, and found œdema of soft membranes, and blood in subdural space. He died same day. Post-mortem examination showed large "sphenoidal" extradural clot at base of left middle fossa (fully reported in this Journal, April 1904).

CASE XIII. W. A., æt. 25. Admitted March 16, 1903, unconscious, having been struck on head by a stone.

Large scalp wound over right frontal eminence, and smaller one posterior to it down to bone; no fracture made out; no bleeding from ears, nose, or mouth. Right pupil small, left wide; neither react. Able to move all limbs, but the right lower limb hardly so well as the others.

17th.—Both pupils small, equal, and do not react. Temperature rising. No further change developed in the symptoms, and he died the following day.

Post-mortem examination limited to head. Diastasis of left coronal suture, beginning at sagittal suture and running

down into base. A very small left (anterior) extradural clot, not reaching higher than level of fissure of Sylvius; a widely diffused subarachnoid hæmorrhage over both cerebral hemispheres; no injury to fourth ventricle.

The weakness of right lower extremity was probably due to the subarachnoid hæmorrhage; it could not have been caused by the extradural clot, as it was much below the leg centre, and was so thin that it probably did not cause any pressure at all.

CASE XIV. J. C., æt. 26. Admitted June 8, 1903. Semi-conscious. Had fallen fifteen feet. No bleeding from ears, nose, or mouth, but vomited some blood after admission. No paralysis. Large hæmatoma in left temporal region, and a fracture felt running back from left external orbital process. Trephined, and a large diffused clot evacuated. A second posterior trephine opening was necessary to get all the clot away. Recovery.

CASE XV. H. B., admitted February 3, 1904. Had fallen one story. Unconscious. Right pupil wide, left small; neither reacting. Large scalp wound in middle line, but no fracture there; large right temporal hæmatoma. Moves right limbs, but not left. No bleeding from ears, nose, or mouth. Explored right temporal fossa; found extensive fracture, and, beneath, a large extradural clot. Also a large subdural extravasation, the dura being lacerated along with laceration of underlying brain. Died same night.

Post-mortem Examination.—Extensive subarachnoid hæmorrhage over both cerebral hemispheres, and laceration of anterior pole of right cerebrum. Right orbital roof widely fissured.

Prognosis.—In all cases it seems to me that the prognosis must be a very grave one. Of my fifteen cases, four were not operated on, one dying immediately after admission. In another (No. XIII.), it was thought the symptoms were due to subdural hæmorrhage (as they were shown to be at the post-mortem examination, the extradural clot being an extremely small one and not responsible for the symptoms in any way). The other two cases (Nos. I. and III.) not operated on showed no sign whatever of the lesion during life.

Of the patients who were operated upon, in one (No. XII.) the extradural clot (sphenoidal) was missed, but blood was evacuated from the subdural space; while of the remaining ten patients from whom the extradural clot was removed at operation only four recovered, a result which is most disappointing. The others had associated subdural hæmorrhage (evacuated in two of them at the time of their operation) and brain injuries, which were the real causes of death.

I am interested to find that Gübler, writing from the Zürich Klinik, records twelve cases, of which eleven were operated on, also with only four recoveries. Weismann, however, found that of his total of 257 cases, 110 were operated on, with 67 per cent. of recoveries; and Scudder and Lund (11) have collected from various sources twenty cases operated on with eighteen recoveries. But these figures almost certainly do not represent the true state of affairs, in fact, Scudder and Lund admit this. There is no doubt that many more successful cases are published than unsuccessful ones.

Operation affords practically the only chance for the patient, and undoubtedly the time at which it is undertaken is of the utmost importance; the later it is carried out, the greater is the degree to which compression of the brain has been brought; and presumably this means the greater the difficulty there is for the brain to re-expand after removal of the clot. This failure or inability of the brain to re-expand certainly occurs. It was very obvious in my Case No. II. Its actual cause is uncertain, but possibly it is due to thrombosis occurring in some of the vessels of the compressed zone; at any rate the heart fails to get blood into the compressed area and it remains unexpanded in consequence; for "compression" only occurs as the result of squeezing the blood out of any area of the brain, whatever the causal agent may be.

Treatment.—The indications are to relieve, at the earliest moment, pressure; to stop bleeding; and to maintain asepsis.

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ON THE DECHLORINATION TREATMENT OF DROPSY[1]

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My attention was first drawn to the important part which chloride of sodium plays in some forms of dropsy, through the case of a gentleman suffering from diffused nephritis with general anasarca and effusion into the serous cavities. During his illness when anasarca had become marked, he took an intense dislike to salt or salt food of any kind, and on examining the urine it was found that the total daily excretion of sodium chloride was far below the average. On looking into the literature of the subject, one found that in the previous year the question had been considered by several workers of the French school, especially Widal, Achard, and Javal.

Widal points out that with a chloride of sodium accumulation in the body, œdema results, and this is attended by an increase in the patient's weight and an increase in albuminuria. On the other hand, when chlorides are withheld, the weight and albuminuria diminish, and the œdema may disappear.

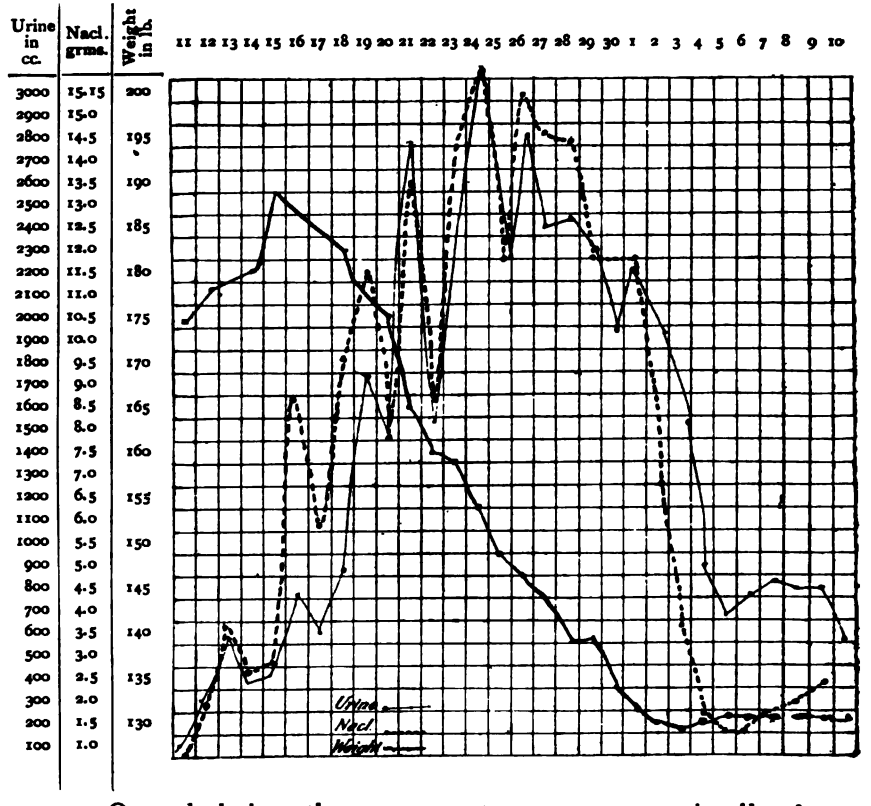
Renal inadequacy with deficient excretion of sodium chloride is well illustrated by the following case.

The patient, a man aged 57, was admitted to the Deaconess Hospital complaining of swelling of the legs, abdomen, and hands. For twenty-five years he had suffered from attacks of bronchitis every winter; ten years ago he first noticed swelling

[1] The analyses in this paper were carried out in the Laboratory of the Royal College of Physicians, Edinburgh.

of the ankles. In the last four years he had suffered from frequent attacks of breathlessness, and during that time he had been seldom without œdema of the legs. His symptoms had been severe, and he had been confined to bed for nearly three months.

CHART SHOWING URINARY AMOUNT, EXCRETION OF SODIUM CHLORIDE, AND PATIENT'S WEIGHT.



On admission there was extreme anasarca implicating practically the whole body. The respiratory system showed signs of bronchitis and considerable effusion into both pleural sacs. The heart was dilated, there was no murmur. The radial vessel was thickened, the arterial pressure low. The abdomen was swollen, the abdominal wall œdematous, and the abdominal cavity contained free fluid. The urine was small

in amount and contained albumin, but no formed elements were found. The patient was kept in bed and prescribed a light diet, 1½ pints of fluid being allowed in twenty-four hours. No medicines were given. From January 12 to 17 any change in the patient's condition was for the worse, there being a slight increase in weight and a corresponding increase in œdema. The urinary quantity remained low; the arterial pressure had distinctly increased; moderate on admission, it had become distinctly high. A small quantity of fluid was drawn off from the chest and legs, and venesection performed.

The patient was prescribed a chloride free diet, consisting of bread baked without salt; meat, fish, and fowl cooked without salt; potatoes cooked without salt and eaten with fresh butter; the amount of fluid allowed was kept at 1½ pints. During the first twenty-four hours there was little change in the patient's condition, but on the second day of the diet the improvement began, the pulse pressure fell markedly, and the urinary quantity increased to more than double what it had been on any day during the preceding period.

This diuresis was maintained continuously till all œdema had disappeared. The intake of chlorides on the prescribed diet was about 2 grm. in the twenty-four hours. As shown on the chart, there was an enormous excretion of chlorides, the excretion closely following the excretion of water. Accompanying the diuresis was a corresponding loss of weight; from 190 lb. it fell to 132, at which it remained stationary. After being œdematous for years, the patient on an altered diet took some seventeen days to get rid of all œdema and of the surplus chloride of sodium in the tissues.

Cryoscopy showed—

Blood	Δ	0.62
Urine	δ	1.45
Fluid from chest	δ	0.61
Fluid from legs	δ	0.6

Quotient $\frac{\Delta}{\delta} = +$

Chlorides—

Blood	0.58% Nacl.
Fluid of legs	0.75% „
Fluid from chest	0.74% „

The cryoscopic examination shows a marked depression of the freezing-point of the blood, a depression so marked as to indicate pronounced renal inadequacy; the blood, in fact, was loaded with excessive numbers of dissolved molecules. The freezing-point of the blood, ascitic and dropsical fluid from the leg is practically identical, the difference between 0.62 and 0.6 being within the limit of experimental error. We may take it, then, that those fluids were isotonic, a result which *a priori* one would have expected.

The amount of chloride present in the fluid drawn from the pleura and subcutaneous tissues, 0.75 and 0.74 per cent., is considerably in excess of the amount usually accepted as being in solution in dropsical fluid, but the figures correspond so completely from several analysis, as to leave no doubt as to their accuracy. The amount of sodium chloride in the blood is considerably below that in the fluid taken from the tissues, a point which has been noted by several observers. The amount of chloride of sodium in the blood always remains a fairly constant factor; when chloride is taken by the mouth in amount above the capacity of the kidneys to excrete, the chloride does not accumulate in the blood, but passes out into the tissues in a state of solution, and hence œdema results. In a case of albuminuria with renal inadequacy, œdema may be produced or dissipated by varying the dosage of chloride of sodium in the food. Say that the kidneys can excrete 5 grm. sodium chloride in twenty-four hours, if 10 grm. be taken in the food there will be a surplus 5 grm. per diem to pass out into the tissues and œdema will result. When sodium chloride is withheld in the diet below the amount which the kidneys are capable of excreting, there is a call on the part of the blood for chloride of sodium which is satisfied from the surplus chlorides in the tissues. The chloride passes out of the tissues in solution and a relative hydræmia is produced; this hydræmia will produce in its turn a diuresis. Œdema thus diminishes.

It is interesting to note the relation which chloride of sodium appears to bear in the diet commonly prescribed in nephritis. A milk diet has long been empirically prescribed in acute nephritis. Now, milk is not an article of food which contains a very limited amount of nitrogen, and cannot therefore, on this ground, be considered an ideal food for resting

inflamed kidneys. Milk, however, contains a very small proportion of chloride of sodium, and by prescribing milk a chloride free diet is obtained. The diminished intake of chlorides will in many cases explain the diuresis and general improved condition which follows a diet restricted to milk in cases of nephritis with œdema. In such cases, not only is there a percentage diminution in the albumen, during the period of diuresis, but the total amount of albumen excreted is also diminished.

Von Noorden classifies sodium chloride as a substance which is easily excreted by the kidney. This does not seem invariably correct; damaged kidneys may find even a small quantity of sodium chloride far beyond their excretory capacity.

It is not my intention for a moment to advance the view that chloride of sodium alone is responsible for the œdema in all cases. Dropsy may be dependent on many other factors; yet even in dropsy resulting from grave cardiac and renal disease, it has frequently been my experience to see the œdema dissipated by withdrawing sodium chloride from the diet, when every other means had failed. For example, a female aged 44 was under my care in the Deaconess Hospital, suffering from advanced mitral regurgitation and sub-acute diffused nephritis. On admission, dyspnœa and cyanosis were marked, there was excessive anasarca of the lower limbs, abdomen, and feet, and effusion into the serous sacs. The heart was markedly dilated, there was mitral and tricuspid regurgitation, a venous pulse in the neck, the radial pulse was irregular and of low pressure, and the urine contained albumin in large amount and granular and hyaline casts. The patient was prescribed a light, dry diet, and given cardiac tonics and diuretics; the pleural and peritoneal cavities were aspirated. During nine weeks the patient remained *in statu quo*; dyspnœa and discomfort were relieved by the tapping of the pleura and peritoneum, the patient was in fact kept alive by bi-weekly paracentesis but, neither drugs nor paracentesis had any influence on the urinary quantity, which remained low, 20 to 30 ounces, and there was no diminution in the subcutaneous œdema. On investigating the chloride excretion in the urine, it was found to be very low, averaging on an unrestricted chloride intake only 1.5 grm. in twenty-four hours.

All medicines were stopped and the patient was put on a chloride free diet: little or no improvement occurred during the next four or five days.

Diuretin and digitalis were then ordered, drugs which had been freely used during the first nine weeks with no benefit; the urinary quantity, and with it the percentage in total chloride excretion rose, and anasarca gradually diminished, till at the end of nineteen days all œdema had disappeared. At the commencement of the dietetic treatment the patient's weight was 8 st. 6½ lb.; at the end of three weeks it had fallen to 6 st. 6 lb. During the period of diuresis the chloride excretion rose as high as 18 grm. in the twenty-four hours.

With the copious diuresis the patient's general condition improved, the pulse-rate fell, the cardiac dilatation diminished, and she was discharged from hospital convalescent.

In estimating the chlorides, direct titration was not used, as the increase given in the reading by that method was found very variable: 10 c.c. of urine were taken, 2 grm. of chloride free sodium carbonate and some nitre added, evaporated at a low temperature, then excinerated, and the residue dissolved in distilled water, and titrated with standard silver solution.

A CASE OF SUPPURATIVE HEPATITIS FOLLOWING INFLAMMATION IN AN ACQUIRED DIVERTICULUM OF THE SIGMOID FLEXURE

By J. MACKIE WHYTE, M.D.,
Physician, Dundee Royal Infirmary

S. G., aged 65, a man who had a stall in the Greenmarket and also a small business in Highland ponies, was admitted to the Dundee Royal Infirmary, under my care, on October 24, 1905. Present illness had lasted about 3 weeks. Previous health good. Never been abroad. Has lived a good deal alone. Had not taken alcohol for 21 months. A physician who used to attend him states that he was excessive in the use of alcohol for many years. Three weeks before admission, he believed he got a chill. Since then he had been confined

to bed, taking fits of shivering frequently. Beyond a feeling of extreme weakness, there was no notable symptom. On examination, he was found to be a stout, well-built man, with dilated veins on cheeks and nose. There was no œdema or jaundice, but he was suffering from the results of a rigor, his hands and tongue being tremulous, and his skin perspiring freely. His circulatory, respiratory, and urinary organs were free from disease. His tongue was apt to be dry and coated, but there was no pain or tenderness or enlargement of the liver when he came in, or any time thereafter. During the nine days of his stay in hospital (he died on November 4) he had eighteen rigors, each lasting from fifteen to thirty, or on one occasion fifty minutes. There was no regularity in their incidence, the interval being sometimes only two or three hours; once it was thirty-six hours. Temperature oscillated from 96° to 106° or 107°. Delirium was usually present in the rigor, with incontinence of urine and fæces; in the interval he was sane but apathetic. Complexion became greyish as time went on. He died exhausted. An agar blood-culture and blood-films made by my house-physician, Dr Arnott Dickson, were submitted to the pathologist on October 26. He reported the culture was sterile and the films showed no organisms—only an excess of polymorphs. Slight jaundice was noted the day before death.

A post-mortem examination was made soon after death and was somewhat hurried, as the friends were waiting to remove the body. Right lower lobe was adherent from recent pleurisy. In peritoneal cavity some opaque muddy fluid with foul smell. Liver 4 lb. 7 oz.; surface of dark slaty hue. Left lobe full of abscesses, consisting of dirty grey pus. Several also in right lobe; also many grey foci, apparently an early stage of abscess. The cavities varied in size from that of a marble, down. Liver substance generally soft and red; outline of lobules not very distinct. No pylephlebitis. Spleen and kidneys apparently normal. A portion of the large intestine (about 8 inches long) was removed. It was the sigmoid flexure. In its wall, near the mesenteric attachment, was a cavity of about the size of a thrush's egg, with smooth lining, communicating with the intestinal lumen by an oval opening as large as a goose-quill. Another smaller opening perforated the

peritoneal coat, but a natural closure of this had occurred through recent inflammatory adhesion. There was no sign of general peritonitis. Surrounding the cavity was a greyish wall of varying thickness, the whole swelling measuring two inches longitudinally by one and a half transversely. Professor Sutherland, the pathologist, pronounced this to be a false diverticulum. A fæcal concretion was the probable cause of suppuration and inflammatory induration; hence, infection of liver by portal circulation. The liver abscesses were due to bacillus coli. He further pointed out there were numerous false diverticula in the excised piece of gut. Most of these were very small, but two or three containing fæces were as large as a pea or French bean. They were between the transverse ridges, and were mostly near the mesenteric attachment. Another row, however, was present at the opposite side. The appendices epiploicæ were specially numerous. The whole lumen seemed to be less than normal, and the internal appearance was specially rugous. It is regrettable that the whole of the intestine was not preserved, to see how far the diverticula extended.

Compared with Meckel's diverticulum, these false or acquired diverticula are rare. According to Nothnagel, they are generally multiple, varying in size from that of a millet-seed to that of an apple, more frequent in the colon than elsewhere, nearly always on the concave surface close to the mesentery. They are hernial protrusions through the muscular coats. No satisfactory account of their origin has been given.

The sequence of events in this case is comparable to what is met with in connection with the appendix vermiformis. The liver apparently guarded the body from a general pyæmia, but it was not sufficiently powerful to kill the invading bacilli. While it was strongly suspected that the lesion was abdominal, it was difficult, in the absence of localising signs, such as pain or jaundice, to be sure. The jaundice near the end was such as might have been present in a general septicæmia. On the other hand, the absence of signs of endocarditis, of localising signs in lungs, kidneys, or joints, and of any cause for a general infection, made the case for portal pyæmia fairly strong. Enlargement of liver, as shown at the autopsy, is frequently not made out in life, through its falling away from the

abdominal wall owing to its reduced consistency. There was no reason whatever for the existence of a tropical abscess.

As to treatment, it is probable that any surgical intervention would have been ineffectual at the time he came into hospital. But if he had come in a fortnight earlier, I think a surgeon would have been justified in searching for a cause of the rigors in the portal area. In cases where examination of the vermiform appendix is negative, where there is no sign of gastric or intestinal ulcer, of ulceration of gall-bladder or gall-ducts, etc., it would be well to bear in mind the possibility of a "diverticulitis."

Births and Deaths registered in Eight of the Principal Towns of Scotland during December 1905

DURING the month of December 1905 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth the births of 3828 living children, of whom 1976 were male, and 1852 female. These births are equivalent to an annual birth-rate of 25.8 per thousand of the estimated population of these towns, a rate which is 0.3 less than that for the previous month, and 1.2 less than that for the corresponding month of the previous year. The birth-rate for the month was highest in Greenock, 29.0, and lowest in Edinburgh, 19.3. In Glasgow it was 28.0; in Leith, 26.9; in Perth, 26.2; in Aberdeen, 26.0; in Dundee, 25.8; and in Paisley, 25.5.

Of the total births, 305, or 8.0 per cent., were illegitimate. This illegitimate rate for the month was highest in Dundee, 9.7, and lowest in Greenock, 4.0. In Leith it was 9.1; in Aberdeen, 8.6; in Glasgow, 8.2; in Edinburgh, 7.8; in Perth, 6.6; and in Paisley, 4.3.

Deaths registered in these towns during the month numbered 2621, which is equivalent to an annual death-rate of 17.6 per thousand. These deaths are 85 fewer than in the previous month, and 431 fewer than in December 1904. The death-rate for the month is 1.2 less than that for November, and 3.2 less than that for December 1904. The death-rate for the month was highest in Greenock, 24.1, and lowest in Perth, 14.5. In Dundee it was 23.0; in Glasgow, 17.4; in Aberdeen, 16.8; in Paisley, 16.4; in Edinburgh, 15.8; and in Leith, 15.6. In Glasgow, Edinburgh, and Greenock, this rate is less than the

corresponding rate for November; in the remaining towns it is higher.

Of the 2621 deaths registered during the month, 950, or 36.2 per cent., were of children of less than five years old, while 658, or 25.1 per cent., were of persons of over sixty. The former are 31 fewer than in the previous month, and 182 fewer than in the corresponding month of the previous year; the latter are 33 fewer than in the previous month, and 119 fewer than in the corresponding month of the previous year.

Deaths of children of under one year old numbered 545, a number equivalent to an infantile mortality of 129 per thousand births. This infantile mortality is 16 less than that for November, and 29 less than that for December 1904. The infantile mortality for the month was highest in Dundee, 188, and lowest in Leith, 85. In Greenock, it was 185; in Aberdeen, 171; in Edinburgh, 130; in Perth, 130; in Glasgow, 112; and in Paisley, 106. In Glasgow, Edinburgh, and Leith, this rate was less than what it was in November; while in Dundee, Aberdeen, Paisley, Greenock, and Perth, it was higher than in that month.

Deaths from the principal epidemic diseases in these towns during the month numbered 266; this is equivalent to an annual death-rate from these causes of 1.8 per thousand, a rate which is 0.1 per thousand more than that of November, but 0.3 per thousand less than that for December 1904. The death-rate from these causes for the month ranged from 6.5 in Greenock, and 4.3 in Dundee, to 0.4 in Aberdeen. In Paisley this rate was 2.2; in Glasgow, 1.7; in Edinburgh, 0.7; in Leith, 0.7; and in Perth, 0.7.

There were no deaths registered as due to small-pox. Deaths from measles numbered 153, which is 5 more than in November, and 82 more than in December 1904; of these deaths, 78 were in Glasgow, 42 in Dundee, and 22 in Greenock. Deaths from scarlet fever numbered 15, which is 5 more than in the previous month; of them, 3 were in Glasgow, and 8 in Greenock. Deaths from diphtheria numbered 33, which is 9 more than in November; of them, 15 were in Glasgow, 6 in Edinburgh, and 4 each in Dundee and Greenock. Deaths from whooping-cough numbered 33; these are also 9 more than in the previous month. Deaths from fevers numbered 11, of which 9 were ascribed to enteric fever and 2 to typhus fever. Deaths from diarrhœas numbered 21, and are 14 fewer than in November. Deaths from influenza numbered 16, which is 10 fewer than in November, and 11 fewer than in December 1904.

Deaths from puerperal septic conditions numbered 6; from malignant disease, 140, of which 67 were ascribed to carcinoma,

6 to sarcoma, and 67 to cancers not otherwise specified. Deaths from heart disease numbered 235; from apoplexies, 152; from premature birth debility, 74; and from alcoholism, 6.

Deaths from pneumonia numbered 276, and constituted 10.5 per cent. of the total deaths, while those from bronchitis numbered 241, and constituted 9.2 per cent. of the total. Deaths from pneumonia were 33 fewer than in November, and 139 fewer than in December 1904; while those from bronchitis were 9 fewer than in November, and 128 fewer than in December 1904.

Deaths from phthisis numbered 194; these constituted 7.4 per cent. of the total deaths, and were 16 fewer than in November, and 35 fewer than in December 1904.

Meetings of Societies

Edinburgh Medico-Chirurgical Society

A CLINICAL meeting was held in the Royal Infirmary on December 20, 1905—Dr J. O. Affleck, President, in the chair.

Dr Norman Walker showed cases of mycosis fungoides, and of ringworm treated by X-rays. The latter illustrated a distinct advance on previous methods of treatment. The hair usually grows again in three months' time.

Dr Logan Turner and Mr Alexis Thomson showed a patient after total extirpation of the larynx for malignant disease.

Dr Allan Jamieson showed cases of roseola and molluscum fibrosum.

Sir Thomas Fraser showed: (1) a girl suffering from peripheral neuritis, caused by small medicinal doses of arsenic in the course of treatment for chorea; (2) a young man showing an extreme degree of peripheral neuritis, caused by the abuse of tobacco; (3) an interesting group of three cases of morbus cœruleus, in all of whom, in spite of cyanosis on the least excitement or exertion, the pulse seemed adequate aud dropsy was absent; (4) a case of *urticaria e frigore* in a man who showed no other symptom. The application of cold readily produced a lesion, but thermal, electrical, mechanical, and chemical stimuli were negative.

Mr Cathcart showed a patient after operation for abscess of the liver containing gall-stones.

Dr Bruce showed a case of lupus improved after tuberculin treatment by Wright's method.

Mr Alexis Thomson exhibited a patient illustrating the effect

of Ball's operation for intractable pruritus ani; a patient, aged thirty-five, nine months after removal of the cæcum and glands for sarcoma; and a patient, aged thirty-one, after resection of the pyloric segment of the stomach for cancer.

Mr Scot Skirving showed a patient after prostatectomy by Freyer's method; a girl after operation for perforated gastric ulcer, performed forty hours after the rupture; a boy after operation for acute obstruction due to tubercular stricture, with later ileo-colic anastomosis; and a man with dislocation of both ends of the clavicle.

Dr James showed cases of epidemic cerebro-spinal meningitis, sprue, Malta fever, and a case after pneumonia intercurrent in diabetes mellitus in which the excretion of sugar had greatly decreased during the attack.

Mr Caird showed patients illustrating coxa vara, after nephrectomy for calculus, after removal of large intra-abdominal lipoma, and after operation for rectal carcinoma.

Mr George Chiene showed a child after transplantation of tendons for infantile paralysis; a patient, aged twenty-one, after operation for cleft palate; and a patient after operation for acute general peritonitis forty-eight hours after rupture of a gastric ulcer.

Mr Cotterill showed: (1) two cases of exophthalmic goitre after removal of the right half of the thyroid under local anæsthesia; (2) a case of stricture of the œsophagus after intubation; (3) a case of hypertrophy of the fingers, legs, and feet, associated with a nævoid condition of superficial veins of the limbs. X-rays photographs indicated that the shafts of the bones were thin and twisted, and the ends dilated and rarefied.

THE fourth ordinary meeting was held on January 17, 1906—Dr J. O. Affleck, President, in the chair.

Dr James Cameron showed a strangulated testicle from a case of strangulated hernia in an infant six weeks old, who had been successfully operated upon.

Dr Douglas Wilson, Harrogate, showed radiograms of the hands of a case of tophaceous gout.

Captain E. D. W. Greig, I.M.S., gave a lantern demonstration illustrating the work of the Uganda Sleeping Sickness Commission. Sleeping sickness had only existed in Uganda for six years, and had probably been introduced from the West Coast by Soudanese troops. An early sign of the disease is enlargement of the posterior cervical glands, which may for a long time precede any other symptom. Trypanosoma gambiense may be obtained in the gland juice.

These patients are a source of danger in introducing the

disease to fresh localities. After a time they show pyrexia, and begin to look drowsy, they may become maniacal, they emaciate and finally become helpless and die. As soon as nervous symptoms develop, trypanosomes may be found in the cerebro-spinal fluid. Anæmia is not found and lymphocytosis is present. The cells in the cerebro-spinal fluid are lymphocytes, and post-mortem a packing of the perivascular spaces in the brain with lymphocytes is found. The disease is propagated by a tsetse fly, glossina palpalis. Sleeping sickness may be transmitted to monkeys either by injection of trypanosomes or by the bite of an infected insect.

Big game harbour the parasites but are immune to their pathogenic effects.

Mr G. L. Chiene read a paper on the use of stovaine as a spinal and local anæsthetic.

An analysis of the literature indicated that most authors had obtained satisfactory results, and Mr Chiene's own experience with the drug had been encouraging. The paper will be published in full in next month's Journal.

Dr Shennan read a paper on the relation of Spirochæte (spironema) pallida to syphilis.

The history of the subject, the results hitherto obtained, and staining methods were discussed. The points which seemed in favour of S. pallida being the causal agent in syphilis were, that it is found deep in the lesions, that it is found in closed lesions, in the blood and subcutaneous tissues, in congenital syphilis and in experimentally inoculated syphilis in monkeys, and that it had never been found in normal skin, or in any lesion but syphilis, with the exception of yaws, which Jonathan Hutchison holds to be identical with syphilis.

Obstetrical Society of Edinburgh

THE third ordinary meeting of this Society was held on the 10th January—Dr J. W. Ballantyne, President, in the chair.

After specimens had been exhibited by the President and Dr Freeland Barbour, Dr W. E. Fothergill, of Manchester, contributed a paper on "A case of Eclampsia, followed by Puerperal Melancholia, which was treated with Thyroid Gland Substance." The patient was 44 years of age. The urine contained only a trace of albumin, slight œdema was present in hands and feet, and the general health during pregnancy had been good. Under light and mainly vegetarian diet the albumin disappeared from the urine. Labour was progressing normally, and the head was

on the perineum, when a violent eclamptic convulsion took place. This seizure lasted about three minutes, and left the patient semi-conscious. Chloroform was administered, and the child was delivered by forceps. The child required artificial stimulation of the respiratory function for 1½ hours before voluntary respiration was established. As the mother had a full, hard pulse, Dr Fothergill separated the placenta as soon as the child was born, and allowed about 15 ounces of blood to escape from the placental site.

The following morning the patient's condition was satisfactory, though the pulse was full and hard. Sixteen hours after labour she was again seized with a very violent convulsion, and as the patient appeared to be in danger of immediate death from cerebral hæmorrhage, Dr Fothergill opened a vein in the upper arm and allowed 18 ounces of blood to escape. A complete hot wet pack was then applied, and the skin induced to act by the application of hot bottles. When undisturbed, her breathing was stertorous, and there was slight twitching of the facial muscles, but she could be roused without difficulty. As this condition persisted twenty-four hours after her delivery, and as the pulse had become harder, slower, and fuller, the vein was again opened and about 15 ounces of blood allowed to escape, when the pulse became soft and more rapid. The wet pack was continued throughout the night and during the next day, though the patient's condition was satisfactory. Though the diet was restricted to milk, there was a moderate amount of albumin in the urine at first, but it soon disappeared. The patient passed most of her time asleep, and when awake complained of severe headache on one side. The infant died on the fourth day. By the end of the first week the patient's condition was satisfactory, except for the headache, and by the end of the second week she was allowed out of her bed for a short time. On the fifteenth day the headache was troublesome, and she became hysterical in the evening, the temperature rising to 100.5° F., and on the following morning signs of melancholia appeared. She refused food entirely and was irrational. Speech was muttering and unintelligible. She slept heavily and could only be roused with difficulty, and then recognised no one. Though the character of the pulse was good, it was very slow (46 per minute). Albumin was now absent from the urine. Intestinal lavage brought away large quantities of foul-smelling material. The condition of stupor continued for several days. Three days after the onset of the low condition, constant sleep, slow pulse, and inability to sleep, five grains of thyroid substance were given three times daily. Dr Fothergill had taught since 1900 that the poison was the same, or nearly the same, in eclampsia, in

melancholia and mania, in amblyopia, in the polyneuritis of pregnant and puerperal women. This was the first case, however, in which he had observed both eclampsia and melancholia in the same patient. After the third dose of thyroid had been given the pulse-rate rose to 60, and the patient's general condition improved greatly. Soon afterwards the patient began to recognise her friends and to help herself, though she was conscious of some mental incapacity and of loss of memory. The pulse soon rose to 70, the tongue was clean and the bowels acted perfectly, and the urine was normal in character. The treatment by thyroid was continued, and the dose was not increased. Five weeks after her confinement the patient was practically well, though she had entirely forgotten the period during which she had been ill.

Drs James Ritchie, Berry Hart, Oliphant Nicholson, Keppie Paterson, Freeland Barbour, M'Vey, Fordyce, Porter, and J. W. Ballantyne took part in the discussion which followed.

Dr Barbour Simpson contributed a paper on "The Use of the Stereoscope in the Teaching of Obstetrics and Gynæcology."

Dr Frederick Porter then read a paper on "Pyuria in the Female." His observations had been made on over 300 urines, and he found that out of every four urines examined, one contained pus and bacteria. Females of all ages were liable to pyuria, but the percentage was greater in the married. Dr John Campbell, of Belfast, found that 135 out of 544 consecutive cases examined in private practice demonstrated pus in the urethra or in Skene's glands; while of 372 hospital patients consecutively examined, 135 had pus in the urethra or in Skene's glands. Dr Porter's observations showed that the bacillus coli communis was present in the majority of cases. Pus might be present in the urine of females without causing any symptoms referable to the urinary tract, but Dr Porter had seldom found pus in the urine of male patients, unless there were symptoms referable to the urinary tract. So far he had come to no conclusion regarding the primary cause. When pus was present in the urine, the reaction was dependent on the micro-organisms present. The ease with which a leucorrhœal discharge became contaminated with micro-organisms constituted a grave danger as regards the infection of the urethra. That pyuria was a cause of septic infection during the puerperium, Dr Porter had no doubt.

It was impossible to say by merely microscopic examination whether pus was present in the urine when it existed only in small amounts, and a microscopic examination of a film prepared and stained with iodine was necessary to demonstrate the pus cells stained reddish brown. As regarded the organisms present,

bacillus coli communis, streptococci, gonococci, staphylococci, pseudo-diphtheritic bacilli, and numerous other rod-shaped bacilli might be found. By far the greater number of the cases enumerated had received infection from the anal and vulvar passages. Dr Porter's conclusions were: (1) that pyuria in its mildest form should be looked upon as a septic condition; (2) that leucorrhœa existing with pyuria made it highly probable that infection had taken place from the vagina, and that leucorrhœa should be looked upon as a septic condition; (3) that the urine of all pregnant women should be as carefully examined for pus as for albumin, as puerperal fever might be caused by infection from the urethra; (4) that the presence of the colon bacillus in vaginal discharges made the probability almost a certainty that infection was from the anus.

The communication was discussed by Drs Ballantyne, Berry Hart, and James Ritchie.

Royal Medical Society

A MEETING of the above Society was held on Friday, January 19—Dr A. W. Neill in the chair—when Dr Newman, of Glasgow, gave a demonstration on "Cystoscopy." He proceeded first to show the difficulty of differential diagnosis in many kidney and bladder cases, which can be at once overcome by cystoscopic examination. Dr Newman held that cystoscopy was as important in diseases of the urinary tract, as laryngoscopy, ophthalmoscopy, etc., are in their respective branches of surgery. The mechanism of the instrument which he uses was carefully demonstrated, and was seen to possess a great many advantages over the ordinary cystoscope, most notably a double eye-piece, by means of which Dr Newman had been able to obtain faithful drawings of the various appearances of the bladder.

These pictures were exhibited on a screen by a special apparatus, and showed a large number of morbid conditions. By means of an ingenious device, Dr Newman demonstrated the appearance produced by normal urine, blood, pus, etc., entering the bladder from the ureter.

Dr Chambers moved, and Dr Wells seconded, a hearty vote of thanks to Dr Newman for his most interesting and edifying demonstration, and this was heartily accorded.

Glasgow Medico-Chirurgical Society

THE seventh ordinary meeting was held on January 12—the President, Dr Lindsay Steven, in the chair.

1. Dr G. B. Buchanan read notes on a fatal case of acute ascending paraplegia occurring in a man of 49, suffering from prostatic hypertrophy complicated with pyuria. The patient had become somewhat rapidly ill during the three weeks previous to his admission to hospital. Both kidneys were enlarged to about twice their natural size. When examined by the cystoscope the bladder was found to be deeply sacculated, but apparently not inflamed, the prostate appearing as a projecting mass. The right ureter was gaping and discharged a flocculent fluid, and the left was somewhat swollen and œdematous. The urine contained a little albumen and a deposit of pus; tubercle bacilli were searched for but not detected. The patient did not seem in any way disturbed by the examination, which was conducted without anæsthesia; but two days after, he was a little sick in the morning and had a slight shivering fit in the afternoon, though by six o'clock he seemed well again. At 8 P.M. the house surgeon was called to see him, and found that he could not move his feet or legs; and by 11 P.M. the paralysis had spread to the hand, to the extent that he could only move it slightly. At this time the legs and the abdomen were completely paralysed and flaccid. The plantar reflex was normal, but the knee-jerks were absolutely gone. Sensation to pain, touch, and locality was normal. At 12.30 the arms and hands became absolutely paralysed. The breathing became irregular, approaching the Cheyne-Stokes character, and the intercostals were evidently paretic. At 1.15 A.M. the breathing became laboured, and the patient died. Pupils were normal in size and reaction all the time; consciousness was perfect to the last and no pain was felt anywhere. The temperature was subnormal throughout, except just before death, when it reached 99.4°.

The question of etiology in this case was made more difficult by the impossibility of obtaining permission for an autopsy. It was suggested that the passage of an instrument in a patient who had recently been losing health, with his urinary system already obviously diseased, might have induced an increased absorption of poisons into the blood, leading to a profound intoxication of the cord without giving any precursory signs. Attention was drawn to an important paper read by Dr Walker of Peterborough before the Clinical Society of London last year, in which he recorded three cases of fatal ascending paralysis

occurring in the course of chronic cystitis, and remarked that no writer previously had associated such cases with Landry's paralysis. "Urinary paraplegia" had been recognised by Stanley in 1833, and indeed by Troja as far back as 1780, and since that time had been the subject of much debate, especially as regarded its pathology. Walker, on the basis of Leyden's deductions on "urinary paralysis," and Farquhar Buzzard's on Landry's paralysis, concluded that his cases were due to myelitis from infection through the medium of the nerves supplying the bladder or kidneys. A study of Buzzard's researches, however, showed that there were good grounds for believing that the majority of the cases of Landry's paralysis were due not so much to an inflammation, as to an acute intoxication of the cord by poisons reaching it by means of the blood or other channels. Charcot recognised three forms of "urinary paralysis"—(1) due to myelitis; (2) due to purely reflex causes, and transitory in character; and (3) due to lesions of the lumbar nerves, following direct infection from the urinary organs. And it seemed proper that a fourth should now be added, namely, one due to acute intoxication of the cord, with primary degeneration of its ganglion cells. Dr W. Hunter deprecated the use of the term "Landry's paralysis" for such conditions, as being neither sufficiently descriptive nor constant in its meanings, and preferred the expression "acute ascending paralysis." He also gave some particulars of a case recently under his observation of a boy who died of this condition following on sore throat. In his case the cord was soft, and the ganglion cells were degenerated, but no microbes were detected in any of the sections.

2. Drs Leslie Buchanan and W. Ernest Thomson read a short paper on "Injuries to the Eye of the Child during Labour." The clinical observations had chiefly been made at the Glasgow Maternity Hospital (to which institution Dr Thomson is ophthalmic physician), while Dr Buchanan was mainly responsible for the histological work. They considered such conditions as fracture of the orbit, extrusion of the eyeball, hæmorrhage into the retina, damage to the optic nerve, and the development of these corneal opacities to which attention has frequently been called by Dr Jardine. This is the only place where these peculiar lesions have been worked up; they are due to a rupture of the posterior layer of the cornea.

3. Dr A. Lewis M'Millan (*a*) read a short note on "Intracapsular Cataract Extraction"; and (*b*) showed a patient from whom he had removed the lachrymal sac.

Glasgow Pathological and Clinical Society

THE fourth ordinary meeting of this Society was held on January 8—the President, Professor Muir, in the chair. There was a good attendance.

1. Dr Kerr Love gave a demonstration of the methods employed to demonstrate the residual hearing in the deaf and dumb. No child born was probably entirely deaf, though entire deafness might occur later. Various means for testing were employed, such as a special bell, tuning-fork going through all the scale, Politzer's acoumeter, etc. If deafness came on about six, there was difficulty in a child retaining its speech. The deaf child with bad eyesight was also difficult to teach. The two great methods of instruction were the oral and manual. These were elaborated about the beginning of the eighteenth century, the manual in France by the Abbé de l'Epée, the oral by Heinecke in Germany. Of deaf mutes, 25 per cent. had valuable residual hearing, and by teaching children by the oral method many might be taken out of institutions and taught in ordinary schools. Moreover, children should be taught to speak that they might afterwards marry ordinary individuals, for in the marriages of deaf mutes with one another, deaf mutes appeared in the offspring thirty times more frequently than among ordinary people. Dr Love concluded his interesting paper by a demonstration on children from the Deaf and Dumb Institution.

2. Dr Alexander Napier showed: (*a*) a case of lupus verrucosus in a girl of 18. She was in hospital two years ago for it, and had the skin curetted and the thermo-cautery applied. She is now back with a typical warty eruption, mixed with the scars of the old treatment. She reacts typically with tuberculin. (*b*) Dr Napier also described a case of transposition of the viscera in a woman of 26. The liver was entirely to the left side and the heart and spleen on the right. The apex-beat was in the fifth right interspace, four inches from the sternum.

3. Dr Laurie of Greenock gave an account of a case of supra-pubic prostatectomy, in which a sarcomatous mass, weighing over two pounds, was removed from the bladder of a patient aged 77 years. Acute symptoms set in on December 16, the prostate being enlarged and the bladder evidently the seat of a tumour. The catheter could not be passed, and the bladder was tapped next day. Dr Laurie opened the bladder above and scraped out a large sarcoma. A tube was left in for ten days, and the patient did well. This operation was done in a crofter's hut in the country, amid very primitive surroundings. Professor Muir showed sections of the growth.

Editorial Notes and News

The Lectureship on Gynæcology.

THERE is, we think, general satisfaction that the Managers of the Royal Infirmary were unable to accept the proposals put before them by the University, and we hear that a conference is to be held. This seems the most likely method of arriving at a solution satisfactory to all concerned.

The Chair of Medical Jurisprudence.

SO much else has been going on in the political world that we suppose the Secretary for Scotland has not been able to find the time to make this appointment. Would it not be a good thing in connection with the new Professor to arrange that he should give annually four or five lectures on Medical Ethics. We use the term in its wide sense, not as referring merely to the question of whether Dr A. should or should not have attended Dr B.'s patient, but as pointing out to the budding graduate the rules which should guide him in his relations to the State, the public, and his fellow-practitioners. Prof. Saundby, a recognised expert on the subject, recently delivered in Birmingham an excellent series of lectures on these lines, and we believe the University of Edinburgh might do worse than imitate its active younger sister.

Spoons.

IT has often been remarked that the things which most strongly excite our interest are those which are in some way strange or unusual, while common everyday objects often fail to receive the attention they deserve. A good example of this is furnished by the undoubted fact that there exists a very widespread misapprehension as to the average capacity of the ordinary varieties of the domestic spoon. This misapprehension is a matter of some moment, and not undeserving of remark in this journal, seeing that spoons are commonly made use of as domestic measures for medicine. The fact to which we desire to draw attention is the great divergence between the actual capacity of spoons and the nominal capacity as understood by prescribers and dispensers of medicine. The orthodox teaching on the subject is that one fluid drachm corresponds to a teaspoonful; that a dessert-spoon holds two drachms; and that the capacity of a tablespoon is four drachms, or half an ounce. This teaching, however, is totally incorrect. As a matter of fact, each

class of spoon holds about twice as much as it is commonly supposed to do. No doubt spoons themselves vary somewhat in size, and there is also room for some divergence of opinion as to when a spoon is really full. The majority of tablespoons, however, hold a full ounce without difficulty, though a few drops more will cause an overflow. Some particularly large tablespoons will hold fully a drachm more than an ounce. The ordinary dessert-spoon will easily hold half an ounce. Teaspoons vary in capacity more than the other kinds of spoon. Those used for afternoon tea often hold just about a drachm—sometimes even less; ordinary domestic teaspoons hold a drachm and a half, or even two drachms; while the kitchen teaspoon, so often used for measuring medicine, holds rather more than two drachms. We have just measured such a spoon, and find that seven spoonfuls correspond to fully two ounces. It is obvious, therefore, that the common practice of prescribing medicine by the spoonful may easily be attended by considerable danger if full doses of powerful drugs are being administered. No doubt patients often guard themselves by not filling the spoon used quite full, but we have often known a six ounce bottle of which a tablespoonful was to be taken three times daily to be finished in two days, and not very long ago we met with a case where the use of a kitchen teaspoon as a measure was almost attended by very serious consequences. We were asked by a student to see a baby whom he was visiting, The child, we were told, seemed to be quite well, but was apt to go into a fit if anyone touched it. The fits were unattended by loss of consciousness. On visiting the child we found the description quite correct, but were at a loss to understand the nature of the illness. However, the mother happened to mention that the child was getting a "tonic" which another student had ordered shortly before, and on looking at the prescription we found that drachm doses of the mixture contained considerably larger doses of strychnine than we should have cared to prescribe for an infant of such tender years. Moreover, on asking to see the spoon by which the medicine was measured, we found it was a very large one, though nominally a teaspoon, its capacity being considerably over two drachms. The fits rapidly disappeared when the tonic was replaced by small doses of aqua menthæ piperitæ.

It would be interesting to know how the current misapprehension as to the size of spoons has come about. Is it just one example more of a mistake in some old text-book having been copied into all subsequent text-books without anyone taking the trouble to verify the statement? We think not. More probably the error is due to a gradual change in the size of

spoons. The modern dessert and tablespoon are much larger than those in common use forty or fifty years ago. Teaspoons seem to have varied more in size, some old teaspoons being quite as large as those now in use, while others were much smaller. Some old silver teaspoons and dessert-spoons in our possession hold fairly accurately one and two drachms respectively. Why spoons should have increased in size would be difficult to say. The change may be simply due to the fluctuation of fashion. It can scarcely be maintained that the size of the human mouth has greatly increased in a generation or so. A possible explanation may be found in the substitution of electro-plate for silver, or in the comparative cheapness in recent years of the pure metal.

The moral to be drawn from the foregoing remarks evidently is that medicines should be prescribed in drachms and ounces, and measured in a proper measuring-glass. The proper directions should be written on the prescription in English, not in Latin, for if the dose is indicated by symbol, or even in unabbreviated Latin, the chemist will inevitably translate in terms of spoons. If we order *drachmam unam* to be administered, we shall certainly find one teaspoonful indicated as the dose upon the label of the bottle. On the other hand, if we order in plain English one drachm, two drachms, or half an ounce, we may induce our patients to purchase a small measuring-glass, and so not only save them from the consequences of an overdose of doctor's stuff, but give some little assistance to the glass industry, which we understand from the tariff reformers to be in a bad way.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

NEUROLOGY

By ASHLEY W. MACKINTOSH, M.A., M.D., Aberdeen

CEREBELLAR TUMOURS

RECENTLY a considerable amount of attention has been given to tumours lying in the angle between the pons and cerebellum, compressing but not directly involving either: these extra-cerebellar tumours are circumscribed, encapsulated, easily separable from the surrounding tissues, generally fibromatous in character, arising often from one or more of the cranial nerves, especially the auditory. Their situation renders them

very difficult of access to the surgeon, otherwise they would be much more amenable to surgical interference than most intra-cerebellar tumours: and successful operations have been recorded (*vid. infra*). It has been noted as a curious fact by several observers that they occur much more frequently on the left side than on the right: Stewart and Holmes (*Brain*, 1904, p. 522) give notes of eleven such cases, of which nine were on the left side, one on the right side, and one on each side.

An excellent account of the symptomatology of intra-cerebellar and extra-cerebellar tumours is contained in this paper of Grainger Stewart and Gordon Holmes (*loc. cit.*), based upon the study of forty cases, in twenty-two of which the diagnosis was confirmed by operation or by autopsy. Their conclusion is that "cerebellar tumours rarely, perhaps never, run a latent course, or fail to produce clinical symptoms"; that "this typical symptomatology is never met with in other conditions unassociated with other signs," and that, therefore, "the accurate diagnosis and localisation of the majority of uncomplicated cerebellar neoplasms is possible."

The following is a synopsis of the chief symptoms and physical signs noted by these writers in intra-cerebellar and extra-cerebellar tumours respectively:—

A. Intra-cerebellar Tumours.—*General symptoms* (headache, vomiting, optic neuritis) tend to appear very early, very constantly, and in pronounced degree. The head pain is generally most intense in the occipital region, and is frequently limited to this area for long periods; the next most frequent site is frontal or retro-ocular, and the headache seldom remains limited to this region. In the majority of cases the degree of optic neuritis is greater on the side of the growth.

Attacks of *vertigo* form one of the most constant symptoms. There is often a definite sense of movement of self or of surrounding objects, and in both cases the movement is always from the side of the tumour to the opposite side; where there is a tendency to rotation, the patient tends to roll over in bed towards the sound side.

Cranial nerve symptoms, apart from ocular, may be present, but in slight degree. Nystagmus is almost invariably found: it is rarely present spontaneously, and is more marked on lateral than on vertical movements of the eyeballs; it is always most marked on looking towards the side of lesion, while, in conjugate movement of the eyes to the opposite side, the oscillations are of smaller range, but in more rapid succession. Weakness of the sixth nerve, never complete, may occur on the side of lesion, and there may be a tendency for the eyes

at rest, to deviate to the sound side. Skew-deviation of the eyes is frequently noted after acute attacks or after operation, the eye on the side of lesion looking downwards and inwards, the opposite eye outwards and slightly upwards. Slight deafness may be present on the side of tumour, and tinnitus, if present, is vaguely described as "noises in the head," and is not referred to either ear. The fifth cranial nerve is rarely affected, so that anæsthesia or paræsthesia of the face is infrequent. Facial paresis, of peripheral type, on the side of tumour is slight and inconstant. Bulbar nerves are rarely, if ever, affected.

Motor symptoms.—Ataxia, atonia, paresis of limbs on the side of lesion appear to be, in the order named, the essential signs of cerebellar disease in man. *Paresis* of limbs on the side of lesion, generally more marked in the upper limb, is one of the most constant and definite signs. Paresis of the trunk-muscles is also very marked, especially of those of the vertebral column, so that the patient cannot sit up in bed without support, or straighten his back. *Atonia* or defective tone in muscles of limbs of the side of lesion is shown by the limp and flaccid condition of the muscles when handled, by the lack of normal resistance to passive movement, and by the soft and flabby consistence of the muscles. It is noteworthy that this defective muscular tone may be associated with increase of tendon-reflexes. *Ataxia* of limbs on the side of lesion, and not infrequently to a less degree of the opposite limbs, is a classical sign. The arm is affected more than the leg: even where the patient is scarcely able to walk, there may be comparatively slight ataxia of the leg movements carried out in bed; ataxia of the trunk-muscles is largely responsible for the gait. Cerebellar ataxy is more or less characteristic, and there should rarely be any difficulty in recognising it; it appears only in active movement of the limbs, it is not increased when the eyes are shut, it does not increase towards the completion of the action, and the limb remains steady when its object is attained. In striking contrast to ataxia on movement is the remarkable steadiness with which the arm on the side of lesion can be extended horizontally, and held for a considerable period. In many cases the *attitude* of the head is characteristic, viz. slightly bent towards the side of lesion and rotated, so that the chin is deviated towards the opposite shoulder, and the occiput approximated to the point of the shoulder on the side of lesion; this attitude is, however, neither constant nor pathognomonic. In a large proportion of cases there is lordosis in the dorso-lumbar region, and the patients are often inclined to bend over to the side of the lesion. There are two distinct

components of the drunken, staggering, reeling *gait*—(1) a tendency to stagger or stumble to the side of lesion, less frequently and to a less extent to the other side; and (2) a tendency to deviate from the desired direction towards the side of lesion, a sensation of compulsion in that direction, so that, were it not corrected, the patient would describe a definite circus movement to this side, with the shoulder on the side of lesion towards the centre of the circle; almost invariably he attempts to correct this tendency by rotating the trunk towards the other side, and he may even over-correct the original deviation and tend to go towards the healthy side—this may mislead. Frequently, in walking, there is definite ataxia or awkwardness of the leg on the side of lesion, and it is generally abducted and rotated out, so as to broaden the base: he can always stand more steadily on the opposite leg. When the feet are placed together, the tendency is generally to fall backwards and to the side of lesion. The most common form of "FIT" is an attack of vertigo. In a few cases there is a history of isolated jerks, or a short series of sudden shock-like jerks, of the arm on the side of lesion, occasionally of the other arm in slighter degree, often associated with attacks of vertigo. In two cases, as the result of intra-cerebellar hæmorrhage in one, Stewart and Holmes noted purely tonic fits, with abrupt onset but gradual relaxation, in which rotation took place of head, trunk, and limbs on their longitudinal axes from the side of lesion to the opposite side, and deviation of the eyes in the same direction: the head was retracted, and the back arched and laterally curved, so as to be concave to the side of lesion.

Reflexes.—The tendon reflexes are strikingly variable: they may be exaggerated, weak, or abolished, and they may change rapidly in the same case within short periods. Perhaps they are most commonly diminished on the side of lesion. Ankle-clonus does not occur. The superficial reflexes are generally normal, unless there is pressure on the cortico-spinal system. The extensor form of plantar reflex does not occur in cases of uncomplicated intra-cerebellar lesion.

Sensory symptoms, including affection of the sense of position of the limbs and astereognosis, are absent, unless the tumour involves the pons.

There are no special *mental* symptoms; any acute increase of intra-cranial pressure may cause a drowsy or stuporose state.

The *cranium*, in the majority of cases, shows considerable tenderness on pressure over the occipital region, generally greater on the side of lesion.

B. Extra-cerebellar Tumours.—*General symptoms.*—Any or all of them may first occur late in the history of the case and may not be marked. The head pain is almost constantly occipital, and may radiate down the neck.

Vertigo is specially frequent. As in intra-cerebellar cases, the movement of objects in front of the patient is always from the side of the lesion to the opposite side, but, while in intra-cerebellar lesions the subjective rotation of self is in the same direction, in cases of extra-cerebellar tumour it has always been in the reverse direction—an important diagnostic point. Where there is a tendency to rotation, the patient tends to roll over in bed towards the side of lesion.

Cranial nerve symptoms, apart from ocular, are invariably present, and often in marked degree, notably affection of the auditory nerve. The characters of the nystagmus and other ocular signs are the same as in intra-cerebellar lesions. Marked or complete deafness on the side of lesion occurs early, and tinnitus is frequent, always referred to the corresponding ear. Affection of the trigeminus on the side of lesion occurs very frequently, often in considerable degree, the sensory root suffering more often than the motor: thus pain, paræsthesia, or definite sensory loss is common on the corresponding side of the face, and the sense of taste is frequently diminished or lost on the anterior two-thirds of the corresponding side of the tongue. Generally there is definite facial paresis, sometimes amounting to complete palsy, on the side of lesion; twitching of the facial muscles on this side occasionally occurs. The bulbar nerves are affected not infrequently; thus may occur weakness of the palate, less often of the tongue and vocal cord, on the side of lesion, with difficulty in swallowing and articulation or even phonation. In some cases the tongue may deviate to the sound side, due to pressure on the pons affecting the fibres going to the hypoglossal nucleus above their decussation.

Motor symptoms.—There is seldom definite *paresis* of limbs on the side of lesion, but frequently spastic paresis of the opposite limbs and occasionally of the limbs on both sides is found, due to pressure of the tumour on pyramidal fibres in the pons. There is rarely any *loss of tone* in muscles of the limbs on the side of lesion, but, from pressure on the pons, there may be hypertonicity of muscles, especially those of the opposite limbs. *Ataxia*, the same in degree and in quality as in intra-cerebellar lesions, is a marked sign. There are, however, often irregular tremors in the horizontally extended arms, as a rule equally marked on the two sides: they may be so coarse and so accentuated on volitional movement as to resemble intention-tremor. The *attitude* of head, tendency to dorso-lumbar

lordosis, etc., are the same as in intra-cerebellar lesions. The *gait* is also the same, but, if much pressure is exerted on the pyramidal tracts in the pons, the gait may be complicated by definite spastic paresis of the opposite leg, so that the patient may stand better on the leg on the side of lesion, and may stumble on the spastic limb.

Reflexes.—The tendon reflexes are rarely diminished; they are generally exaggerated, and ankle-clonus frequently occurs, especially on the opposite side. The superficial reflexes are often, in association with the spastic paresis, diminished, especially on the opposite side; in similar conditions, an extensor plantar response may be found on the opposite or on both sides, but it seems to occur only in the later stages, and may be absent throughout the whole course of a case, despite great compression of the pons.

Sensory symptoms, apart from some anæsthesia of the trigeminal region resulting from direct pressure of the tumour, are absent as in intra-cerebellar lesions.

Operation for Cerebellar Tumour. In a former number of this Journal (vol. xiii. p. 432), reference was made to the pessimistic view of Starr with regard to "After a considerable experience . . . it seems to me futile to attempt this operation." This view is very far from being confirmed by the results of operations on many of the 22 cases whose notes are given in the appendix to Stewart and Holmes' paper. A large proportion of the intra-cerebellar tumours were successfully removed, and little sign of cerebellar disturbance remained except slight degree of lordosis and a tendency to stumble to the side of lesion. The results in extra-cerebellar tumours were much less uniformly brilliant, but, at least in two cases out of eleven, large tumours measuring respectively 4 and 3½ cm. in diameter were successfully removed, and in one of these cases there was very little unsteadiness in gait at the end of seven months after operation. Very useful remarks on the surgical aspects of cerebellar tumours are to be found in "Tumours of the Cerebellum," New York, 1905, where C. H. Frazier discusses in detail the operative technique, the difficulties and dangers attending the operation, etc. He emphasises the remarkable impunity with which the surgeon can incise into the cerebellum, and even remove a large part of a hemisphere, without the risk of such disturbance of function as would follow a similar procedure in the motor area of the cerebral cortex. The shortest, as well as the safest, route to the favourite site of extra-cerebellar tumour in the angle between the cerebellum and pons is along a line parallel to the petrous portion of the

temporal bone; the surgeon should, therefore, approach the tumour from the lateral rather than the superior or inferior aspect of the cerebellum.

Frazier has collected 116 cases of operation on cerebellar tumour, and finds, from a comparison with earlier statistics, a marked increase in the percentage of recoveries and improvements, and considerable reduction in the mortality; the progress has been specially notable in recent years, as will appear from the last column in the following table, given by Frazier:—

Results.	Oppenheim's Table, 1902.	Duret's Table, 1903.	Frazier's Table, 1904.	Cases in Frazier's Table, reported 1899-1904.
	Per cent.	Per cent.	Per cent.	Per cent.
Recovery . .	7.5	14	15	24
Improvement .	7.5	25	28	28.5
Non-Improvement	13	...	15	11
Mortality . .	71	60	42	35.8

James Collier (*Brain*, 1904, p. 490) has a particularly suggestive paper on **The False Localising Signs of Intra-cranial Tumour,** based upon the results of 161 consecutive cases of intra-cranial tumour which have been examined in the Pathological Laboratory of the National Hospital, 1894-1904.

False localising signs were met with in 20 cases, *i.e.* 12.5 per cent. In some cases they were due to vascular lesions situated at a distance from the tumour, or to spreading œdema of the brain in the neighbourhood of the neoplasm, or to the occurrence of deposits on the spinal roots, secondary to a primary cerebral growth; in 3 cases, shooting pains in the limbs, loss of deep reflexes in the legs and ataxy were presumably referable to degeneration of the posterior columns of the cord, which occurs frequently in cases of intra-cranial tumour and was very marked in these 3 cases.

But far the most frequent and important cause of the false localising signs is ventricular distension, resulting from the tumour; such secondary hydrocephalus may occur with a long-standing growth in any situation. The chief signs which may arise in this way are:—

1. *Paralysis of cranial nerves.*—This was present in 16 of Collier's cases, the 6th nerve or nerves being affected oftenest (12 cases), while the 3rd, 5th, 7th, and 8th nerves were each

involved in 2 cases. The 1st, 4th, 9th to 12th nerves were never indirectly affected. Collier does not accept the usual explanation of the special liability of the 6th pair to suffer from general increase of intra-cranial pressure, viz. that it is because they have a long intra-cranial course and an exposed position. He believes that such indirect paralysis of cranial nerves is due to the hydrocephalus shifting the brain-stem backwards, and thus causing traction on the nerves attached to the brain-stem; this will have little effect on the roots which run transversely (*e.g.* 9th to 12th), but must have a great effect on the nerves which run more or less straight forwards, notably the 6th, and, to a less extent, the 3rd, 7th, and 8th.

2. *Jacksonian epilepsy and general convulsion.*—These were noted specially in cases of tumour of the brain-stem and cerebellum. Hydrocephalus is capable of causing local, as well as general convulsion. In Collier's opinion it is "a very commonly accepted fallacy that local convulsion is a sure sign of local gross lesion of the cerebral cortex."

3. *Bilateral spastic paresis*, often slight, with increase of deep reflexes, clonus, extensor response in the plantar reflex. This occurred where there was no direct or indirect involvement of the pyramidal tracts, and is to be ascribed to the cortical changes (wasting, partial evascularisation) resulting from secondary distension of the ventricles.

4. *Cerebellar signs*, attributed by Collier to distortion and compression of the posterior parts of the cerebellum, which is driven back along with the brain-stem by the supra-tentorial pressure, so as to lie partly within the foramen magnum and be indented by its edge. He believes that cerebellar signs not infrequently occur in this way, *e.g.* nystagmus, ataxy, the gait and attitude of cerebellar disease.

But—and herein lies the chief point of this valuable paper—all such signs, when they occur as indirect and not as true focal signs of intra-cranial tumour, appear *late* in the disease. Collier, therefore, submits this argument: that "local signs, appearing late in the course of intra-cranial tumour, where general signs alone have pre-existed, are often of false portent." In other words, such important and outstanding signs as paralysis of cranial nerves, Jacksonian epilepsy, bilateral spastic paresis, cerebellar signs, when they appear for the first time long after the general symptoms of intra-cranial growth have been evident, are to be disregarded, or, at least, not allowed much weight in local diagnosis.

Another point, of great localising significance, emphasised by Collier, is that "a tumour, which, while giving rise to marked general symptoms, affords no localising symptoms for many

weeks, may be located above the tentorium." "It appears that lesions of the cerebellum are almost always early productive of characteristic symptoms."

Finally, true localising signs at one time present may later disappear (*e.g.* local signs resulting from pressure), or may become concealed or undemonstrable owing to the development of other signs: thus hemianopia, often a sign of great significance, is lost when optic neuritis has produced complete blindness; and again, in cases of cerebellar disease of long standing, it may be impossible to elicit the cerebellar signs, owing to general mental and physical deterioration, resulting from the secondary hydrocephalus and extension of the growth to other parts.

Differential Diagnosis of Organic Hemiplegia and Hysterical Hemiplegia (J. Babinski, *Interstate Med. Journ.*, Aug. 1905). —In many cases this diagnosis is difficult or even impossible, and a mistake in diagnosis may lead one far astray in regard to both prognosis and treatment. Babinski finds that the greatest importance is generally attached to the extrinsic characteristics of the paralysis, *i.e.* to the circumstances in which the paralysis occurs, independently of the special characters of the disturbance of movement. Thus a hemiplegia occurring after a lively emotion, in a young person, presenting stigmata of hysteria, not syphilitic or subject to heart disease, is almost without hesitation regarded as due to hysteria, while the absence of these positive or negative characteristics is supposed to point to organic disease. Babinski does not deny that such points have a value, but he maintains that in no case can they form the basis of a certain diagnosis. He believes, however, that the intrinsic characters of the paralysis should enable one in the great majority of cases to form a precise opinion. He points out that hysterical hemiplegia is distinguished much less by the presence of certain signs than by the absence of certain objective characteristics which mark organic hemiplegia.

The chief differences between these forms of hemiplegia are:—

1. Facial paralysis is, in organic hemiplegia, limited to the hemiplegic side; it is evident equally in unilateral and bilateral movements; its evolution is regular: first a period of flaccidity with evidences of diminished muscle tone on the affected side (*e.g.* lowering of the labial commissure, disappearance of the naso-labial fold, and often smoothing of the wrinkles of the brow and lowering of the eyebrow); next a period of contracture in which generally, but not always, the appearance of the lower face in repose is the opposite of that described; improvement is pro-

gressive, the paralysis not being subject to alternation in improvement and aggravation.

In hysterical hemiplegia, the facial weakness is usually not strictly unilateral; the unilateral movements may be completely abolished, while bilateral synergic movements (*e.g.* in speaking, whistling) are normally executed on both sides; the evolution is capricious, the paralysis may remain flaccid for an indefinite time or it may be spasmodic from the beginning; there is no evidence of diminished muscle tone on the affected side (*e.g.* no smoothing of wrinkles of brow, no lowering of eyebrow, no muscular relaxation of lip and cheek when handled), and, if facial asymmetry is present, it is due to spasm; the symptoms do not improve progressively, and they may vary in intensity and in form from one moment to another.

2. The tongue usually deviates slightly towards the paralysed side in organic hemiplegia; in the hysterical form, the same may be true, but often the deviation is very pronounced and may then be easily shown to be due to spasm, and the deviation may be to the sound side.

3. In some cases of organic hemiplegia, weak action of the platysma myoides on the affected side may be shown in certain movements which call into play the muscles of the two sides, especially forcible opening of the mouth and bending the head forwards against resistance—"the sign of the platysma." This sign has never been observed by Babinski in the hysterical form, although he conceives that it might be simulated.

4. In organic hemiplegia, diminished muscle tone is seen in the affected limbs, *e.g.* lowering of the shoulder, tendency to foot-drop and wrist-drop. It is well seen in the arm in the phenomenon which Babinski calls "*exaggerated flexion of the forearm*"; the supinated forearm on the hemiplegic side can be passively flexed to a much greater degree than on the sound side. This sign is of value only when it is very decided and when there is no muscular wasting of the paralysed limb.

In hysterical hemiplegia, there is no diminished muscle tone and the sign of *exaggerated flexion of the forearm* does not occur.

5. In the majority of organic cases, when the patient lies horizontally on a hard surface with arms crossed on chest and then tries to rise to a sitting position or *vice versâ*, the thigh on the paralysed side is flexed on the pelvis and the heel leaves the floor—movement of "*combined flexion of the thigh and trunk*"; the opposite leg either remains fixed against the floor or shows flexion of thigh and elevation of heel later and to a much less marked degree. The sign is of "great value," but only when there is a marked difference between the two sides.

In hysterical hemiplegia, this phenomenon does not occur.

6. *Reflexes.*—(*a*) Tendon and bone reflexes afford evidence of the "greatest importance." In organic cases they are often disturbed from the beginning; at first they may be either absent, weak, or exaggerated; later, they are almost always exaggerated and in many cases there is clonus.

In hysterical cases they are not modified and foot clonus does not occur. Babinski believes that the exaggeration is only apparent, due to a psychical influence, and that true foot clonus does not occur in pure cases of hysterical hemiplegia.

(*b*) Cutaneous reflexes.—In organic cases these are usually disturbed, while in hysterical cases, they are not altered. In organic cases the abdominal and cremasteric reflexes on the affected side are generally weak or abolished; it may be difficult to elicit the abdominal reflex in a hysterical case, but this is owing to voluntary contraction of the abdominal muscles.

The state of the plantar reflex is of the greatest importance. It is diminished on the affected side in many cases of organic hemiplegia, and this may also occur in the hysterical form. But the extensor form of plantar reflex, so well known as Babinski's "*toe-phenomenon*," which is found on the paralysed side in the majority of cases of organic hemiplegia in all stages, has never been seen by him in hysterical cases. He believes that it is pathognomonic of organic lesion of the pyramidal tracts; its presence "permits us to affirm that the paralysis is organic."

7. The form of the contractures is different in the two conditions. Organic contracture cannot be reproduced voluntarily, while hysterical contracture may be reproduced perfectly. In organic cases the contracture causes a special gait which is not seen in hysterical cases—the trunk is inclined to the sound side and the paralysed leg is circumducted, as if mowing. The grip of most organic cases is also characteristic; when the examiner's hand is slipped under the patient's fingers and an effort is made to extend his fingers, there is a quite characteristic sensation of elastic resistance and, when the hand is extended on the forearm, the phalanges flex on each other and on the metacarpals and thus press the examiner's hand.

8. What has been said of the differences in evolution and course of facial paralysis (*vid. supra*) in organic and hysterical hemiplegia respectively is true of paralysis of the limbs also.

SURGERY

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PNEUMONIA AS A COMPLICATION AFTER LAPAROTOMY

Two important papers dealing with the production of pneumonia after abdominal operations have appeared in recent years in the *Verhandlungen der deutschen Gesellschaft für Chirurgie*, the one by Prof. Heule of Breslau, in 1901, and a later one by Dr Kelling of Dresden, in August 1905. These two papers throw much light on the pathogenesis of this condition—a complication of abdominal operations with which most surgeons are unfortunately too well acquainted—and it is from them that the material of this abstract is taken. The statistics of individual surgeons do not give a fair idea of the frequency with which it occurs, as there is considerable diversity in the figures quoted. Heule, however, collected 1787 cases in which the abdomen was opened for divers conditions in Mikulicz's clinic. From the figures he gives, 143 developed pneumonia, of which 65 proved fatal, representing a mortality of 3.6 per cent. Croupous or lobar pneumonia is not considered.

With regard to the age, Heule states that pneumonia occurs in 5.5 per cent. of patients between 20 and 30 years, while for those over 70 the percentage is 27. Men are more susceptible than women, a fact which may be attributed to arterio-sclerosis from alcoholic indulgence, or to the different type of male and female respiration. Cardiac weakness, emphysema, and prolonged rest in bed are all predisposing causes, since they tend to the production of a hypostatic congestion of the bases of the lungs. As regards the part played by the anæsthetic, it is interesting to note that the percentage mortality is greater after Schleich's cocain infiltration than after either ether or chloroform. Ether, by its greater irritative action on the bronchial mucosa, is in some ways more dangerous than chloroform, but it has a less severe effect on the heart, and by causing less vomiting, diminishes the risk of aspiration pneumonia. In selecting the anæsthetic, the individual features of each patient should be considered separately. Vasomotor influences, *e.g.* cooling of the skin at the operation, should be guarded against. Kelling considers the position of the laparotomy wound is a factor of some importance, for incisions above the umbilicus seem to be attended with more risk than those below it. His explanation is that a serous congestion is set up in the lower lobes of the lung owing to reflex communications between the

divided intercostal nerves and the sympathetic nerves of the lung. Pain caused by the respiratory act also favours congestion of the lungs by interfering with the full action of the diaphragm. Further, alcoholism and cachexia exert a baneful influence on the course of the pneumonia. The prognosis after operations performed for malignant conditions is always worse than when the condition has been a simple one. Heule's statistics show that 14 per cent. of patients develop pneumonia after gastro-enterostomy for carcinoma of the stomach, with a mortality of 9.6 per cent, while 9.5 per cent. are affected after a similar operation for a non-malignant process. The mortality in the latter condition he found in his cases was nil.

According to Kelling, post-operative pneumonia is due to infection of the lungs in one of three ways:—

1. By the bronchi.
2. By the blood.
3. By the lymphatics.

(1) *Infection by the Bronchi.*—This is naturally the form of infection most liable to occur in patients the subjects of bronchitis or emphysema. The bronchial secretion, which is increased by the anæsthetic owing to diminished expectoration, tends to collect in and fill the finer bronchi, from which it is aspirated to other parts of the lung. Aspiration may also occur of infective sources in the mouth and naso-pharynx, *e.g.* nasal catarrh, decayed teeth, or vomited matter in the mouth. The latter is most apt to occur when the head is lowered, as in the Trendelenburg position, and is especially dangerous in cases of intestinal obstruction or malignant disease of the stomach. Aspiration pneumonia occurs more frequently after laparotomy than after other operations, excluding those on the tongue, mouth, or jaw. In order to determine the frequency of this form of pneumonia, Kelling investigated with great care 200 cases. Of these, 17 had a history of bronchitis. Ten of the 17 developed aspiration pneumonia, with three deaths. Of the 183 others who were free from bronchitis or emphysema, 3 developed it, all of whom recovered. Roughly speaking, aspiration pneumonia occurred in 6.5 per cent. of the cases. Out of 1600 cases collected by Heule in the Breslau Clinic, the percentage mortality where there was bronchitis was 8.5 per cent., 3 per cent. being the mortality amongst those free of bronchitis. From these results, the conclusion is drawn than inhalation anæsthesia should be avoided for opening the abdomen where the patient is the subject of bronchitis or emphysema.

(2) *Infection by the Blood.*—Embolic pneumonia is the term applied to that form of pneumonia resulting from infection by the blood-stream. It is recognised by its late appearance, the

initial fever, etc., coming on after eight to ten days (the former type appears in forty-eight hours). It occurs after operations carried out in infected regions of the abdomen, *e.g.* opening of perityphlitic abscesses, excision of rectum, intestinal obstruction, etc. The process starts from a septic clot in a ligatured vein, the thrombus that forms in the vein becoming detached and ultimately obstructing the pulmonary capillaries. When the ligated vessel is a tributary of the inferior vena cava, it is easy to understand how this can occur, but when we have to deal with branches of the portal vein the explanation is less apparent. Sonnenburg quotes 50 cases of this form of pneumonia occurring in 1000 cases of appendicitis. Some observers hold that in such cases there must be a direct communication between the portal and systemonic veins, *e.g.* the coronary and œsophageal veins communicate with the azygos vein, the inferior hæmorrhoidal with the internal pudic vein, and the veins of the ascending colon with the parietal veins. Others assert that the portal capillaries are larger than those in the lung, and that a thrombus may pass through the portal series and become impacted in the pulmonary set. Such theories, however, are open to much criticism. Kelling believes that the solution of the matter lies in the lymphatics of the mesentery. The lymph vessels surrounding the mesenteric veins empty their lymph into larger lymphatics accompanying the retro-peritoneal veins. A phlebitis or thrombosis of these veins occurs from which infection can spread to the inferior vena cava. Albanus collected 55 cases of embolic pneumonia occurring in 1140 laparotomies, of which 10 followed operations on the appendix. Again, the lymphatics accompanying the vena cava through the opening in the diaphragm are specially liable to become infected in many operations connected with the stomach, *e.g.* posterior gastro-enterostomy, and from their close relation to the inferior cava it is possible for localised inflammatory spots to be set up in the wall of the latter sufficient to produce minute thrombi. Microscopic examination of the wall of the vein would be necessary, however, to prove the truth of such a theory.

(3) With regard to the third mode of infection, lymphatic, the flow of lymph from the liver and from the peritoneum are the two channels along which the infection travels. Lymph leaving the liver is carried to the diaphragmatic pleura by lymphatics lying in the coronary ligaments. In this way, right-sided pleurisy is so common after operations on the gall-bladder and bile ducts, *e.g.* cholecystitis, cholangitis.

The lymph leaving the peritoneum is poured into the diaphragm, from which it is distributed in several ways. Lennander describes it as entering glands in the mediastinum. Tietze has

demonstrated lymphatic channels passing up on either side of the sternum to glands placed behind each sterno-clavicular articulation. From the close relation of these glands to the lung, it is possible that the lungs may be infected by direct spread. The greater proportion of the peritoneal lymph, however, passes into the pleural cavity. In rabbits this has been demonstrated experimentally by introducing a solution of methylene blue underneath the diaphragm. After a short while the colour is observed in the pleura, and even on the under surface of the lung. The thoracic duct is not coloured, which is an interesting fact, showing that the thoracic duct plays a very small part in the absorption of fluids from the peritoneal cavity. Küttner demonstrated the communication between the under surface of the diaphragm and the diaphragmatic pleura in man, the lymph passing through stomata in the diaphragm. From the above experimental evidence one can readily understand the frequent occurrence of pleurisy after peritonitis. According to Tilger's statistics, pleurisy occurs in 25 per cent. of cases of peritonitis, and is ten times more common on the right than on the left side; the reason for this being that most of the lymphatics pass up on the right side.

With the development of a pleurisy along the above lines, one naturally concludes that pulmonary infection should occur from a direct extension of the inflammation through the pleura lining the lung, as occurs not infrequently when pleuro-pneumonia is set up. Kelling, on the ground of the lymphatic distribution of the pleural lymph, does not consider such an explanation correct. He argues that, as under normal conditions there is no communication between the lymph in the pleura and that in the pulmonary lymph spaces (the pleural lymph is drained by the intercostal lymphatics) infection of the lung cannot occur from the pleura unless a negative pressure exists in the pulmonary lymph spaces; in order that this may occur a hypostatic œdema is necessary. Normally, owing to the elastic property of the lung tissues, the lymph in the pulmonary lymph spaces always possesses a positive pressure over that in the pleura, and no lymph can enter the lung from the pleura, but if this pressure is markedly diminished, which occurs when the elasticity is reduced by œdema, on expiration the lymph is forced onwards towards the glands at the root of the lung, and on inspiration lymph from the pleura is sucked into the lung. In support of his theory he devised the following ingenious experiment:—In a jar containing some coloured solution he suspended a healthy fresh lung. In the lid of the jar two holes were bored, into one of which the trachea was tied, while through the other the nozzle of an air pump was

fixed, by which the air in the vessel, which corresponds to the pleura, could be rarefied, and the lung made to breathe. He found on reducing the air in the vessel that none of the coloured fluid entered the lung. He then placed the other lung of the same animal in the jar in the same manner, after rendering it œdematous by ligaturing the pulmonary vein and injecting normal saline up the artery. The result then was very different, for, on rarefying the air in the jar, he found that a slow penetration of the coloured fluid into the lung took place. Whether this experiment actually proves the truth of his theory it is difficult to say, as the physical problem of osmosis between the two fluids was not considered by him.

Further, it is probable that, since the diaphragmatic lymphatics open directly into veins in this region, infection may be rapidly carried by the blood stream. That such a communication does exist between the lymphatics and veins in this region has been proved by injecting under the diaphragm of a living animal some methyl blue solution, when the injected lymphatics can be seen to open into veins, many of which are also coloured. Moreover, the colouring matter appears as quickly in the urine as when it is injected directly into a vein. Ligature of the thoracic duct does not retard its elimination; indeed, it appears sooner in the urine than in the duct itself.

Lastly, Kelling lays stress upon the necessity of preventing infection of the peritoneum from the air. This possible source of infection he considers does not receive sufficient attention from surgeons, and may prove a weak link in an otherwise sound technique. Careful attention to the purification of the air in the operating theatre, the exclusion of students from operations, and the wearing of masks by the operators, are points to which he directs attention.

The following conclusions can be drawn from Kelling's valuable paper:—

1. Patients after laparotomy have a tendency to hypostatic pneumonia, especially of the lower lobes.

2. Aspiration pneumonia occurs more commonly after abdominal operations than after any others, excepting those on the tongue, mouth, and jaws.

3. Patients after laparotomy readily develop pleuro-pneumonia, especially on the right side, if the operation has been conducted in a septic area. The infection is carried by the lymphatics traversing the diaphragm.

4. Embolic pneumonia is not uncommon after laparotomy, the blood being either directly infected from a septic clot in a ligatured vessel or by the lymphatics of the mesentery.

5. Contamination of the peritoneum can cause post-operative

pneumonia from infection and thrombosis of the veins of the diaphragm, owing to the direct communication between the veins and lymphatics in that region.

6. An infection is much more dangerous in laparotomy than in other operations.

OBSTETRICS

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AROUND INFECTION

Puerperal Morbidity.—In the Annual Report of the Rotunda Hospital (*Dublin Journ. Med. Soc.*, June 1905), Professor Tweedy discusses incidentally the question of the standard of puerperal morbidity, and advocates in the interest of the patients a more stringent test than is usually adopted for hospital statistics. Changing the limit of temperature from 100.8° F. to 99° F. for thirty-six hours along with a pulse over 89 p. min., increases the number of his morbid cases from 159 to 202, and even in the large clientèle of the Rotunda this makes an appreciable difference on the percentage morbidity. There is no doubt that in the interest of our patients we habitually attend to subfebrile abnormalities of temperature which at times indicate conditions or impending conditions requiring treatment, and it would probably be a general advantage if our clinical and statistical standards were assimilated. The paragraphs on the treatment of septic cases indicate a changing opinion. Professor Tweedy now looks upon the use of the flushing curette as unjustifiable: but the facts that his constitutional treatment consists of tincture of perchloride of iron in 40 minim doses three times a day, mercurial inunctions or calomel in small doses by the mouth; stimulants and nourishment in large quantities, and that one case is recorded as doing badly with antistreptococcic serum and another well on Credé ointment, show that we have not yet reached stability in the therapy of puerperal sepsis.

Serum Treatment in Streptococcus Puerperal Septicæmia is the subject of an extensive literary review (*Boston Med. and Surg. Journ.*, cliii. p. 213, 1905), read before the Obstetrical Society of Boston by E. B. Young. At the close he adopts Bumm's summary, to the effect that we may expect aid from the serum when we have a localised infection or little more than an endometritis, but none when we have to deal with infections that have spread. At present we have no results which are distinctly

better than those of Krönig and of Williams, who neither operated nor used serum.

Curettage in Puerperal Fever. From the Obstetric Clinique at Lausanne we have a paper (*Rev. Med. d. l. Suisse Romande*, xxv. 641, Oct. 1905) by de Buman on curettage and puerperal fever, in which the results of a series of cases which occurred when curettage was the routine treatment are contrasted with those of a series since it has been abandoned. In the former series of 16 cases there were 8 deaths; in the later series of 8 cases only 1 death. The present treatment is to use an intra-uterine douche (1 per cent. to 2 per cent. lysol) twice in the first 24 hours in a uterine infection, and when the infection has spread further to aid the organism in its struggle with the infection. The reports of the cases are given.

In the *Montreal Medical Journal* (xxxiv. 549, Aug. 1905), E. Macdonald reports a series of interesting cases of **Puerperal Infection** in illustration of its varied character. (1) Primipara, 25, at the seventh month, had passed a buttonhook into the uterus two days before admission. She had persistent vomiting and jaundice and died on the fifth day. There were found endometritis, acute yellow atrophy of the liver, pulmonary œdema; and anaerobic cultures from endometrium, liver, and spleen gave bacillus aerogenes capsulatus, and aerobic cultures from the endometrium gave streptococcus pyogenes. (2) Primipara, with severe vomiting in the ninth month and an evening rise of temperature to 102°, died on the day of delivery at term. There were found numerous small abscesses in both kidneys and double pyoureter. The pus gave staphylococcus pyogenes aureus, and this had also produced a septicæmia. (3) Patient had an angina with slight evening rise of temperature, and two weeks later, just after the completion of labour at the 7½ month by spontaneous expulsion of the placenta, became suddenly cyanotic and died in two minutes. There were found in the brain three distinct areas of softening, with pus under the pia, thrombosis in the longitudinal sinus, and also thrombi in the broad ligament veins, in the left renal vein, and in two of the larger pulmonary veins on the left side. Cultures from the uterus and left renal vein gave streptococcus pyogenes and proteus vulgaris, those from the spleen and meninges were sterile. (4) Primipara, 18, admitted with fever six days after delivery at the seventh month. She had vulvar warts and free purulent discharge, uterus fixed and tender, and a small mass on the right side. Leucocytes 29,000. Three days later, after a large stool, she suddenly had severe abdominal pain and difficulty

in breathing. Laparotomy was done a few hours later, when there was found severe general peritonitis, appendix adherent to the right tube, which was swollen and exuding pus. It was removed with the uterus and the cavity drained; pus exuded from the cut broad ligament. The patient died in a few hours. The peritoneal fluid and tubal pus gave B. coli and streptococcus. (5) Abortion at the fourth month induced by a midwife with a catheter. Infection, curettage, and packing. Death three days later. Peritonitis and pus tubes with general pneumococcal infection. (6) Patient died on the tenth day, after delivery by a midwife. There were found peritonitis, pericarditis, pleuritis, general infection with staphylococcus pyogenes aureus. B. coli in peritoneum and lung and in pure culture in the kidneys. Macdonald discusses the occurrence of the various forms of infection.

Artificial Hyperleucytosis as a means of increasing the resistance of the body to operative infection (*Mitteil. a. d. Grenzgebieten d. Med. u. Chir.*, xv. 89, 1905).—In an elaborate paper, Renner gives the results of the prophylactic injection of nucleinic acid in 69 men and 64 women in Mikulicz' Klinik during 1904. The details of the cases are given, but it will suffice to give some of the more interesting statistics. Of operations where there was distinct risk of peritoneal infection there were 28 non-malignant alimentary affections; 2 patients died of operative peritonitis; 45 malignant alimentary affections; 3 patients died of operative peritonitis; 11 operations on the biliary passages, 4 kidney operations, 7 rectal carcinomas, 1 pyosalpinx, and 1 suppurating myoma with intestinal fistula, all with no death from operative peritonitis. Comparing the abdominal resections of this period with those of the preceding years which were not injected, we have 94 cases not injected with 29 deaths, and 54 cases injected with 6 deaths; the first set thus giving an almost three times greater mortality for the non-injected cases. If we take the deaths from peritonitis apart from those from pneumonia, pyæmia, and other forms of infection, we get a death-rate of 7.4 per cent. in the earlier series, and 3.8 per cent. in the later. If we take the infective deaths of all kinds, the rates are 25.5 per cent. and 9.3 per cent. respectively. Renner's conclusions are as follows:—

1. Yeast nucleinic acid subcutaneously injected in man produces a definite hyperleucytosis after a transient hypoleucytosis.

2. Its action is as prompt by subcutaneous injection as by peritoneal injection.

3. Under the use of a 2 per cent. solution with a total dose of 1 grm. nucleinic acid, the subsidiary reactions are neither harmful nor specially disagreeable.

4. Though the statistical basis is small, the results seem to show an increase of resistance to the bacillus coli and apparently also to other organisms.

Germ-Content of the Puerperal Uterus (*Journ. Obstet. Gyn. Brit. Empire*, viii. 174, Sept. 1905).—Dr Brownlee, while resident in Dundee Royal Infirmary, investigated the disputed question as to the germ-content of the uterus during the normal puerperium, in the light of our local material. The observations were made on 20 women whose temperature was normal during the puerperium. Thirty-seven specimens of the intrauterine lochia were collected by Doederlein's tubes, and the secretions examined by film and by culture both aerobic and anaerobic. Of the 37 specimens, 3 only showed a pathological organism, the gonococcus. Forty-two specimens of the lochia in the fundus of the vagina were also collected, and of these only 5 showed a pathological organism, gonococcus, bacillus coli communis, and staphylococcus pyogenes aureus being represented in the series. Dr Brownlee thinks the last was due to a contamination. Non-pathogenic organisms were found in nearly all the cases. The results are given in detail, and in addition the paper contains a full summary of the literature up to its date.

Obstetrical Asepsis and Antisepsis (*New York Med. Journ.*, April 1905, p. 686).—Nabbott makes a vigorous claim for antiseptics as a means to asepsis, and after sketching the loopholes in sterile gauze and sterile water, develops his own system. Shortly stated, it consists in the special application of bichloride of mercury, 1/2000 externally and 1/4000 internally, where respectively necessary, and of lysol as a lubricating antiseptic. "In all cases, beginning with the second week after delivery, we usually prescribe a mercurial vaginal douche (1/4000) once or twice daily." In infection he uses the intrauterine douche (1/4000) bichloride, repeated at intervals of six to eight hours, till the temperature remains under 101° (or even 100° in some cases). We have, however, learned to esteem the danger of absorption somewhat more seriously, and as yet America has shown no results better than those of Whitridge Williams.

OPHTHALMOLOGY

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THE ELECTRO-MAGNET IN OPHTHALMIC SURGERY

EVERYONE will admit that the introduction of the electro-magnet into ophthalmic surgery has been of incalculable benefit, for it has saved many eyes which would otherwise have been lost. During the past few years this subject has received considerable attention from ophthalmic surgeons everywhere, and a renewed interest has been given to the subject owing to the more extended use of the so-called giant magnet, introduced by Professor Haab of Zürich, thus allowing greater opportunities for ascertaining the comparative value of the old or small hand magnet and the new or giant magnet.

It is, however, at the present time a moot point whether the small magnet or the giant magnet is the more valuable all-round instrument for the purpose of extracting fragments of steel or iron from the eyeball, some preferring the hand magnet owing to the delicacy of manipulation, others preferring the giant magnet owing to the enormous attractive power available.

The *Ophthalmoscope* of February 1905 has been fortunate in securing the views of three well-known exponents of the use of the electro-magnet in ophthalmic practice, namely Professor Snell of Sheffield, an advocate of the small magnet; Professor Haab of Zürich, an advocate of the giant magnet; and Professor Hirschberg of Berlin, an advocate of what might be called the middle course.

Snell's experience is based on fully three hundred instances in which the electro-magnet has been employed, and in his paper, "The Electro-Magnet in Ophthalmic Surgery," he gives a brief summary of the different classes of cases in which the magnet is employed.

Splinters in the cornea. Here the magnet is of service only in exceptional cases. Among these instances may be mentioned those deeply embedded nearer the posterior than the anterior surface. Attempts at removal of these by ordinary methods will end in opening the anterior chamber and the passage of the body inwards. Such cases, however, can be treated successfully by passing a keratome through the cornea and using it as a background on which to work with a needle or spatula until the foreign body is exposed, and it is then that the point of the electro-magnet will more readily remove the splinter than any other means.

From the anterior chamber and iris the electro-magnet will enable the splinters to be removed frequently with complete preservation of vision. The original wound may need to be enlarged or reopened, or a fresh corneal incision may be necessary. A portion of the iris, if the splinter be entangled, may also require excision. In these cases the magnet often renders excellent service in diagnosis, for if the magnet be applied to the cornea with a short thick end, the nature of a foreign body is disclosed by its movements. This refers also to splinters in or on the capsule of the lens. A fragment may on the approach of the magnet spring forward from the iris or lens capsule against thc cornea ; and Snell has in many instances guided a splinter with the magnet to the most suitable situation for its extraction through a corneal incision.

The majority of cases, as well as the most serious, that require the aid of the electro-magnet, are those in which the foreign bodies are situated in the posterior part of the eyeball. In many the nature of the injury, size, and situation of the wound are such that, apart from the location of the foreign body, the prospect of the recovery of sight is very little. The eyeball, again, may have become seriously disorganised and past recovery before an opportunity for operation is afforded. Fortunately, however, in others the extraction of the splinter results in securing good vision. Taking those in the vitreous first, if the injury be recent and the foreign body be free in the vitreous, as a rule its extraction will be effected without much difficulty by the electro-magnet. The success, so far as recovery of vision is concerned, will largely depend on the situation and size of the wound caused by the foreign body and the time intervening between the accident and the operation. The element of "time" is of the first consequence in vitreous cases. The prospect of saving an eye will be inversely to the interval between the injury and the time when the electro-magnet is employed. Another point is whether the fragment is a clean one or not. The vitreous may be regarded as an excellent medium for the growth of micro-organisms. If the foreign body itself be not septic, the prolapsed vitreous may be the starting-point of sepsis.

Leaving for the present the question of the route to be selected when operation with the electro-magnet is decided upon, it may be mentioned that as short and as large an end should be employed as is consistent with the particular case, bearing in mind always that the power of attraction diminishes rapidly as the attachment is lessened in size or carried further from the coil around the core. Given an electro-magnet, such as the one employed by Mr Snell, attached to a battery in good

working order, Snell states that the failure to extract a foreign body from the vitreous should be very rare. It is curious that the causes of failure with large magnets are placed under the same headings that Snell has been accustomed to do for those of his own small hand magnet. They are the following :—That the foreign body be : (1) embedded in the coats of the eye, at the back part, (2) or entangled in the ciliary region, (3) or embedded in a mass of effusion. As instances of failure, he records cases from his case-sheets.

It is necessary that, when the use of the magnet is decided upon, every care should be taken in the preparation of the eye for operation, and in the sterilisation of the instruments. The end of the magnet which has been selected, and which may, therefore, need to be inserted into the interior of the globe, must be carefully boiled.

When dealing with foreign bodies in the posterior part of the globe, an important matter for consideration is the route by which the magnet is to be introduced into the eye. In a recent case with unclosed wound in the sclerotic this will usually be selected, even if the original wound needs enlarging. There are instances also when the wound of entrance has closed, that it will still be the wisest plan to enter the magnet through the sclerotic when the lens is uninjured. The exact situation must, of course, be determined for each individual case, but care in all must be taken to avoid the ciliary region. Experience has taught Snell that the best procedure is to separate the conjunctiva for some little distance from the intended site of the sclerotic puncture, and then, after bleeding has ceased, to introduce the knife in such a way as to make the incision in a line from the cornea towards the equator. As a result of experience in many cases, Snell finds it is often convenient to select the site between the external and inferior recti muscles, but each case will determine the best situation. The sclerotic wound must be sufficiently large, not only to enable the points of the magnet to be introduced, but to prevent as far as possible the stripping off of the fragment at the edges of the wound. It may be necessary to add to this linear wound a cross cut at its posterior extremity. After the removal of the foreign body, the closure of the separated conjunctiva by sutures will bring into close apposition the edges of the deeper sclerotic wound. The tendency for all sclerotic wounds to become depressed, and to lead to softening of the globe, is well known. In Snell's opinion this is a frequent cause of the failure to obtain or to retain good results after magnet operations. This remark applies to the wounds occasioned by the fragments, which are frequently jagged, as well as, but in a less degree, to the intentional ones made for

their removal. A sclerotic wound means injury also to the choroid and retina, and to the underlying tissues for some distance around. Experience, therefore, has led him to believe that in many instances the anterior route should be selected. This applies especially to cases in which the foreign body has passed through the lens and rendered it more or less opaque. After a corneal section, as much of the softened lens as possible should be removed, and the point of the magnet introduced into the vitreous. The disturbance of the vitreous will often be less, as will the danger of detached retina, than if the sclerotic route had been chosen.

Snell does not believe in leaving splinters of steel which are embedded in and tolerated by the retina, although they cause only slight disturbance in vision, because of future trouble and of the comparative ease and safety with which such fragments can be removed.

The history given by the patient is often misleading. The diagnosis is assisted by the history of the accident, examination with the ophthalmoscope, together with the use of the magnet. The localisation is most important, and this can now be done almost with certainty by the X-rays and a localiser such as Mackenzie Davidson's. Although Snell does not attempt categorically to compare the value of the giant with that of the small magnet, yet he makes it clear that an immense difference between the two is at once evident. The small magnet is easily handled, is portable, and is comparatively inexpensive. It can, therefore, be readily obtained, and be widely employed. For these reasons, Snell is of the opinion that the value of the hand magnet should always be set forth, whatever be the views of those employing the large magnet.

In his paper "On the Correct Use of the Giant Magnet" (*ibid.*), Professor Haab warns his readers that to remove a piece of iron from the interior of the eye, something more than bringing the eye in front of a giant magnet is needed. The success of the operation depends entirely on the intelligent use of the instrument. He describes the requisites of the magnet, emphasising the importance of certain points, such as the use of his foot-switch for making and breaking the current quickly by the operator himself, and loosening a foreign body lodged in the retina or other part of the eye by attracting it in jerks. He considers that the expensive magnets of Meyrowitz, Volkmann, and others are unnecessary, seeing that it is easier to move the patient's head than trust to magnets arranged with movable mechanism. He also prefers the patient to be seated on a chair with his arms resting on a support, and facing the point of the magnet.

Use of the Magnet.—Here Haab draws attention to the fact that the intruding substance, on being attracted forwards, does not follow the way of entrance, but the lines of power of the magnet. Hence it slides almost regularly around the lens, and appears somewhere behind the iris. He warns operators not to pull the iron particle into the ciliary body, iridectomy being superfluous if the operation be performed in the proper way. The operation is always a difficult and a delicate one, so much so that the surgeon must carefully watch the eye when exposed to the magnet during the whole operation, this being easily accomplished owing to the pointed end of the magnet standing well out from the coil. Believing that a speedy extraction of the foreign body is most important, he advises that no time be lost in examining the eye by the X-rays or the magnetic needle (sideroscope). In the majority of cases we need not trouble about the resting-place of the foreign body, although it is most important to look for the wound of entrance, and to make out its size for the purpose of notifying the largeness of the particle. The path taken by the foreign body must be studied, for if we conclude that it is lodged in the ciliary body, we have to be particularly careful in extracting it. Haab points out that the greater number of particles enter the eye through the cornea and the scleral border, and that in 50 per cent. of his 200 cases the lens was injured. Thorough preparation of the eye by means of cocain, atropine, and, if necessary, adrenaline, is most important. The surgeon, standing close to the side of the instrument, clasps the head of the patient with both hands, holds the eyelids apart with the thumbs, and brings the head into the right position. If the patient be nervous, the surgeon should stand behind him and push his head gently forwards towards the instrument. By bending forward he can quite well survey the injured eye.

In the majority of cases the best way back for the foreign body lies through the anterior chamber, and in all these cases the patient's eye should, as a rule, be brought into such a position with regard to the magnet that its point is opposite the middle of the cornea. By doing so the foreign body is prevented from getting entangled in the ciliary body. If we suspect the foreign body to be small, as it generally is, the cornea must almost touch the point of the magnet, and the current must be turned on in full strength at once. If a large particle be expected, the patient's head may remain at a certain distance from the instrument, the larger the foreign body the more powerful the attraction. As soon as the eye is in the proper position the surgeon closes the current with his foot. At this moment the patient often draws back his head suddenly, and it is better to

let him do so, because probably the foreign body has already been pulled behind the iris. It would be injurious to continue the extraction any further in this direction, as the foreign body would become imbedded in the posterior surface of the iris. The current should be cut off, and the eye brought into a new position, according to the spot where the foreign body makes the iris bulge forward. Repeated attraction, if necessary, obliquely through the pupil, will enable the particle to slip into the anterior chamber. Should the particle of iron not be drawn into the anterior chamber, Haab places the patient on the operating-table and extracts it by means of a small magnet, such as Hirschberg's, Snell's, etc., through an incision of the cornea behind the iris, or by Lang's steel spatula, attached to the Haab magnet. Once the particle is got into the anterior chamber it is extracted by means of a small magnet, or, as Haab generally does, by the large instrument. To do this a fair sized incision is made in the cornea, taking care not to allow the aqueous to escape, the sharp point of the giant magnet is brought into direct contact with the incision, when the fragment glides quickly through the incision.

When the wound of entrance is in the sclerotic, some distance from the cornea, it is necessary to decide whether the foreign body should be removed through the original wound or through the anterior chamber. If the wound be quite fresh, it is possible to draw the foreign body back through it by means of the giant magnet, without its being necessary to push the point of the instrument into the wound; for the same purpose the wound in the sclera might be enlarged, or a fresh one made. In this respect Haab considers the big magnet is preferable to the small one. Even a slight opening of the wound in the sclera with the sharp point of the giant magnet would not be a serious risk, if carefully done; but, on the whole, it is preferable to draw the particle, especially if a small one, forward into the anterior chamber. Hence the importance of the giant magnet consists in the avoidance of injury to the vitreous. It is evident that an incision made in the cornea is of much less consequence than one in the sclera.

In conclusion, Haab states that if the foreign body cannot be withdrawn from the eye by the proper application of the giant magnet, it is almost useless to attempt its extraction with the small magnet, especially when there is any uncertainty as to the position of the fragment.

Hirschberg (*Ophthalmoscope, ibid.*) states that he has no prejudice concerning instruments, employing all he finds useful—the hand magnet, the middle-sized, and the giant magnet. His paper must be read in its entirety. Our own opinion practically

coincides with Hirschberg's: all three magnets, especially the hand and giant magnets attached to the town main, having their own particular usefulness. Briefly stated, the hand magnet in our opinion should be used when the foreign body is in the anterior chamber, or when not deeply situated in the vitreous. The giant magnet should, on the other hand, be used in deeply seated foreign bodies, to bring the splinter towards the surface or into the anterior chamber, when its final removal will be better accomplished by the hand magnet attached to the main electric current.

LARYNGOLOGY, OTOLOGY, ETC.

By HENRY PETERKIN, M.A., M.B.,
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THIOSINAMIN IN THE TREATMENT OF CHRONIC NON-SUPPURATIVE MIDDLE-EAR DISEASE

WHILST the treatment of suppurative lesions of the middle ear has of recent years been greatly improved, that of the non-suppurative has made little progress. These latter diseases are still the *bête noire* of the surgeon. Hence any method of treatment which promises to increase, to any extent, our therapeutic efficiency in dealing with them, would seem to be worthy of consideration. Treatment by means of thiosinamin is, perhaps, such an one.

This substance, which was probably first used therapeutically by von Hebra, is an allyl-thio-urea, and is formed by warming together oil of mustard and a strong solution of ammonia. It is sparingly soluble in water, readily so in alcohol and ether. von Hebra, experimenting with this substance in the treatment of lupus, used a 15 per cent. solution in alcohol, hypodermically and intramuscularly. He noticed that the scars became markedly softened during the treatment. Since that time thiosinamin has been used, with more or less success, by the dermatologist in keloid, by the gynæcologist in perimetritic and parametritic thickenings, by the ophthalmologist in corneal opacities, and by the surgeon in pyloric and œsophageal strictures; that is to say, in diseases associated with the formation of fibrous tissue.

A consideration of these facts rendered it probable that thiosinamin might be of some service in those cases of non-suppurative middle-ear disease in which there was reason to suppose that the presence of fibrous tissue in, or in the neighbourhood of, the tympanic cavity interfered with the function

of the sound-conducting mechanism. Towsey of New York, in 1897, recorded a case of deafness in which there was considerable improvement of hearing on treatment with thiosinamin. Randolph of Baltimore, writing on "Chronic Middle-Ear Catarrh" in *Progressive Medicine*, 1903, states that he has "seen some cases distinctly benefited by thiosinamin in half-grain doses three times a day." He considers it of special value in the treatment of tinnitus aurium of middle-ear origin. He quotes Beck and Suker as getting similar results by the use, however, of larger doses. Randolph is not in favour of the administration of large doses, having seen troublesome vertigo result therefrom. Suker has found it of value in cases where a perforation of the tympanic membrane had healed by a cicatrix, which interfered with sound-conduction.

Sugár of Budapest (*Archiv für Ohrenheilkunde*) after reading the literature on this subject, considered that thiosinamin would be useful wherever fibrous tissue interfered with the function of any part of the sound-conducting mechanism as an aid to treatment by mechanical measures, catheter, massage, and so on. He has tried its effect in ten cases. Eight of these were cases of chronic catarrh of the tympanum with negative Rinné, defective hearing for low notes, and prolonged bone-conduction. The remaining two were cases of adherent tympanic membrane, the result of preceding suppuration. No history or detailed account of the cases is given, but Sugár states that the results were very encouraging, and thinks that further trials should be made. He employed it in two different ways, intratympanically, per eustachian catheter, and subcutaneously. In two cases of middle-ear catarrh, and in one case of adherent tympanic membrane, he used the intratympanic method. For this purpose he made use of a 10 per cent. solution in glycerine and water, and injected five or six drops daily over a period of three weeks. At the end of that time he was able to satisfy himself that the tympanic membrane was more mobile, that audition was improved, and that subjective symptoms were diminished. In the other seven cases thiosinamin was employed subcutaneously in the form of a 15 per cent. solution in alcohol. Of this, the contents of three-parts of a Pravaz syringe were injected into the mastoid region three times a week. Later a whole syringeful was used, the upper arm region being the site of injection, the mastoid neighbourhood not being suitable for large injections. In two cases a daily injection of one syringeful was given for a period of four weeks without any unpleasant sequela. Sugár considers the alcoholic solution preferable, for subcutaneous injection, to that in glycerine and water, as thiosinamin is apt to be deposited in the latter. For intratympanic use, how-

ever, the alcoholic solution causes too much pain. He insists on the combination of mechanical with thiosinamin treatment.

M'Cullagh read a paper (Abst. *Archives of Otology*) before the Otological Section of the New York Academy of Medicine on "Thiosinamin in the Treatment of Tinnitus Aurium." It is based on an experience of thirty-eight cases treated with this drug. Thirty-one of these cases were associated with otitis media catarrhalis chronica, and of these, fifteen are reported as cured, seven as much improved, and four as improved. In five cases there was no improvement. Five of the thirty-eight cases of tinnitus were due to otitis media purulenta chronica residua, and these were all cured. Two cases of otitis interna were treated, one of which improved, the other did not. M'Cullagh considers that thiosinamin acts beneficially on such cases of ear disease as are accompanied by the formation of new connective tissue, acting by rendering the latter more pliable and amenable to mechanical treatment, which, he states, ought always to be employed at the same time. He is of opinion that it is the most valuable drug we possess for the treatment of tinnitus aurium, and that during treatment audition improves and vertigo diminishes. Contrary to the views of several writers on the subject, he does not think it necessary to give it hypodermically, equally good results being obtained by oral administration.

Passmore Berens, commenting on M'Cullagh's paper, gave his opinion that thiosinamin would relieve some of the cases of tinnitus which all other means of treatment had failed to alleviate. He had employed it in eight cases which had resisted all the other forms of treatment which he had applied. In two of these cases thiosinamin brought about very marked improvement.

An interesting paper on this subject has been written by Hirschland, of Wiesbaden (*Archiv für Ohrenheilkunde*). He considers that the great drawback to the thiosinamin treatment hitherto has been the want of a suitable form in which to give the drug. It is not readily soluble in water. Solutions in alcohol, or ether, cause a certain amount of pain on injection. The glycerine and water solution precipitates the thiosinamin, requires warming to redissolve, and loses strength in the process. Internal administration, Hirschland thinks, will not set up the required action, but may maintain it after it has been set up. External application has a very limited field of usefulness. Hirschland, therefore, has been on the lookout for a preparation of thiosinamin which should be readily soluble in water, and should not cause pain on administration. Such an one he has found in a preparation discovered by Mendel, and put on the market by Merck under the name of "Fibrolysin." This is a

solution in water of a chemical compound of thiosinamin and sodium salicylate. It is sold in small coloured glass vessels, each containing 2.3 c.cm. of sterilised solution, which corresponds to 0.2 grammes of thiosinamin. Exposure to air and light tends to decompose it. This solution, according to Mendel, acts most rapidly when given intravenously. As, however, there is a certain risk of thrombus-formation by this method, and as subcutaneous and intramuscular injection are just as efficacious, though slower, he advises that intravenous injection should only be used where a very rapid action is necessary. Hirschland's experience with fibrolysin is at present limited, but he is able to state that it is more convenient and more certain in dosage and effect than any of the other preparations of thiosinamin. He has, however, used thiosinamin for two years. As regards the classes of cases treated, they were cases of defective hearing, in which there was immobility of ossicles and membrane, retracted membrane, post-suppurative adhesion of membrane to inner wall, tubal narrowing, and in cases in which the membrane was thickened and opaque, and functional tests showed a lesion of the sound-conducting apparatus. He used the thiosinamin only where other methods of treatment had failed. As regards dosage, during the first week he gave half the contents of a Pravaz syringe thrice, during the second week six times, and during the third week a syringeful six times. He does not approve of intratympanic administration. The duration of treatment until satisfactory effect was obtained was very variable, but Hirschland says he has frequently got good results. In some cases it has been the hearing power which improved; in others, without improvement of audition, the tinnitus and other subjective symptoms have disappeared. Like the other writers, Hirschland emphasises the necessity for combination with mechanical treatment.

Thiosinamin, then, would seem to be a remedy which will be of a certain amount of service in the treatment of chronic non-suppurative middle-ear disease. It seems to have a special affinity for cicatricial tissue. Glas has found degenerative changes in pieces of tissue removed from patients undergoing thiosinamin treatment. Richter has ascertained that a marked leucocytosis occurs two or three hours after injection. This may help to explain the action of the drug.

It may be given with perfect safety, as there seem to be few, if any, unpleasant side effects. Randolph, however, states that he has seen vertigo, and Hirschland has recorded burning and slight pain in pharynx, and on one occasion an effusion into the tympanum requiring paracentesis. Patients under treatment with thiosinamin usually experience a sense of well-being, and frequently increase in weight. The quantity of urine

passed is commonly augmented. There are two important contra-indications—a tubercular focus, and a cicatrix serving a useful purpose.

The Larynx in Typhoid Fever.—An interesting paper on this subject was read before the American Laryngological, Rhinological, and Otological Society by Chevalier Jackson. He is of opinion that: "(1) Serious and fatal lesions of the larynx are much more frequent than is realised; (2) death may occur from laryngeal stenosis without even the existence of a laryngeal lesion being suspected in the absence of laryngoscopy."

These views are based on an experience of 360 hospital cases watched throughout their illness.

Three types of laryngeal lesion were found, namely:—

(1) Subacute laryngitis, without solution of continuity of mucosa.

(2) Ulcerative laryngitis.

(3) Perichondritis with or without necrosis of cartilage.

Laryngitis was found in 227 cases. It presents no peculiarities, and is not in itself of serious import.

Ulcerative laryngitis occurred in 68 cases, or 18.9 per cent. of the total number examined. As regards its bacteriology, although typhoid fever bacilli are formed in the saliva and mucosa, the author is inclined to believe that their rôle is that of predisposing factor, the various pyogenic cocci being the exciting agents.

The location of the ulceration is of interest, those parts of the larynx which are nearest the mouth being chiefly affected. In 68 cases, ulceration was found 42 times on the epiglottis, 22 times on the aryepiglottic folds, 18 times in the interarytenoid space, and 10 times on the arytenoids. Other parts of the larynx were less frequently involved. The vocal cords were singularly free from attack, ulceration only occurring once, and in that case there was a syphilitic history and rapid amelioration on specific treatment.

In considering the etiology, an important point to be borne in mind is the fact that laryngeal ulceration rarely occurs before the end of the third week of illness. In only one case, out of 68, did it do so. Among the predisposing factors, the typhoid toxæmia, and the diminished resisting power of the tissues resulting therefrom, are the most important. The onset and severity of ulcerative laryngitis are largely dependent on the severity of the typhoid fever. Sixty-one out of the sixty-eight cases occurred in patients whose temperature had exceeded 104.2° F. every day for at least a week, and in twenty-three

patients the temperature had reached 105° F. Ulceration occurred in no case in which the temperature had not risen to 103° F. Although these facts regarding temperature are quoted, the author does not consider that it is the pyrexia which is responsible for the laryngeal lesions, but the marked toxæmia of which it is an index. Another important etiological factor is a septic condition of the oral cavity. This was marked in 66 of the 68 cases. Unhygienic surroundings are influential; but sex and age do not seem to have any bearing on the incidence of laryngeal trouble.

Coming now to the question of the exciting factors, Jackson is inclined to the view that the laryngeal ulcers are not true typhoid fever glandular involvements, analogous to those occurring in the intestine. He bases the view on the lateness of their occurrence, their contour—linear, branched, cuneiform—and their location. Ulcers were found forty-two times "on or near the free border of the epiglottis, where adenoid tissue does not exist." A local invasion of the tissue by pus-forming cocci, aided perhaps by trauma, *e.g.* cough, is probably an important element in causation. It seems doubtful, however, in view of the rarity of cord lesions, whether cough is very potent. Many of the ulcers are probably preceded by a local thrombosis, not necessarily infective.

Symptoms referable to the laryngeal lesions may be altogether wanting, and this constitutes the great danger in these cases. Patients may die of laryngeal stenosis without presenting any of the usual symptoms of such. Pain may not be complained of, and hoarseness may be absent. Dyspnœa and cyanosis are infrequent; apnœa, on the contrary, being a common occurrence. So wanting in symptoms are these affections that Jackson considers a diagnosis will be made in only 10 per cent. of cases if symptoms only be relied on. In four of his cases which were saved from asphyxia by tracheotomy, the usual manifestations of dyspnœa were entirely absent.

The prognosis, in regard to life, depends upon the general disease, and not on the laryngeal lesions, *provided* that the larynx be kept under laryngoscopic observation and carefully treated. Jackson says, "No case need die from the throat complication." Of the sixty-eight cases of ulcerative laryngitis, four died; one of relapse with intestinal perforation, two of toxæmia, and one of pneumonia. In three cases ulceration perforated into the soft tissues of the neck, but no serious trouble ensued. As regards the voice, the prognosis is relatively good, forty-five out of the sixty-eight cases healing without alteration in structure and function.

Perichondritis was found in seventeen cases. Four of these

began as abscesses, the remainder resulted from extension of ulceration. Necrosis of cartilage occurred in six. The arytenoids were most frequently affected, the cricoid next. The epiglottis escaped entirely, possibly owing to its better blood supply. The author considers syphilis to be an important etiological factor in the perichondritis cases.

Prophylaxis is important. Suitable ventilation, cleanliness of bedding, clothing, and food are essential. Attention to the condition of the mouth is emphasised. Where lesions have developed, oral antisepsis, benzoin inhalations, mercury and iodide of potassium, even where there is no specific history, are recommended. Early tracheotomy, which was necessary in eight of the author's cases, he considers of the utmost importance. "All lesions disappear as if by magic after an early tracheotomy." It should be performed under local infiltration anæsthesia.

The author concludes by urging the routine laryngoscopic examination of all typhoid fever patients.

New Books and New Editions

Diagnostics of Internal Medicine. By GLENTWORTH REEVE BUTLER, Sc.D., M.D., Chief of the Second Medical Division, Methodist Episcopal Hospital; Physician to Brooklyn Hospital, etc. Second revised edition. Pp. 1168. London: Sidney Appleton. 1905.

TWO-THIRDS of this book is devoted to the evidences of disease and is arranged on the lines of most works on clinical diagnosis. The rest of the work is entitled "Diagnosis, Direct and Differential." In this part a systematic account of the symptoms of individual diseases is given. The two divisions are intended to complement each other. The volume is a little out of the common run. A striking omission is the absence of any directions for urine testing. We read that "in view of the abundant supply of excellent special treatises, both large and small, which deal with the *technic* of urinalysis, it has seemed a work of supererogation to lumber this work with necessarily abbreviated descriptions of the large number of extant methods." This may be true, but surely it is in works of this kind that one expects to find an account of urine analysis, and in our opinion the author's argument would apply with equal force to the sections on the examination of the blood and on the use of Röntgen

Rays. At the same time the significance of the various findings in the urine is fully discussed. A large (and we think, unnecessary) amount of space is devoted to purely anatomical diagrams. For example, we find two coloured plates showing the relations of abdominal and thoracic viscera, and there are whole page illustrations of such subjects as the roots of the cranial nerves. Even if the author does not credit his readers with some knowledge of anatomy, he might assume the possession by them of an anatomical text-book. We think, too, that the numerous diagrams showing a supposed painful area, with a list of the possible or probable sources of the pain, are not worth the space they occupy. On the other hand, the illustrations of types of disease, etc., are really good. An excellent idea is embodied in the illustrations of the various blood cells. Examples are reproduced from several standard works, and in this way the reader may note the different appearances which may result from differences in technique. We have nothing but praise for the actual text of the work. The information given is sound, concise, and up-to-date. The sections on the parasitic, renal, blood, and mental diseases have been written by the author's hospital colleagues.

The Medical Diseases of Egypt. By F. M. SANDWITH, M.D., F.R.C.P Part I. Pp. 316. London: Henry Kimpton. 1905. Price 7s. 6d. net.

THOSE acquainted with Dr Sandwith's numerous contributions to Egyptian medicine do not stand in need of assurances on our part that the present work, which is the fruit of twenty-one years of medical experience in Egypt, is well deserving of perusal. As the author points out in his preface, more than half a century has elapsed since Pruner and Griesinger wrote their classic works on the diseases of Egypt. Much has changed since then. To instance only one marked step in advance, a system of medical registration of diseases and deaths has been introduced, which has furnished the basis of a more accurate knowledge of the distribution of diseases, of their actual prevalence, and of their incidence on the various races, than was within the reach of his predecessors. Conjectural estimates have given place to actual figures, and this gives a scientific value to Dr Sandwith's work which cannot be over-estimated.

The work, he tells us, is an amplification of his lectures to the students of the Egyptian School of Medicine. It will be completed in two volumes, the first of which is before us. It

opens with an introductory chapter on the medical history of Egypt, which we wish had been fuller. The present volume consists of twenty chapters, many of them dealing with common diseases, such as typhus, relapsing, enteric, Mediterranean, and scarlet fever; small-pox, chicken-pox, mumps, whooping-cough, and influenza. Although there is no pretence of an exhaustive treatment of any of these subjects, numerous facts are brought out in respect to the etiology of most of them, not met with in ordinary text-books.

The chapters, however, of special interest are those on Plague, Bilharziosis, Ankylostomiasis, and Pellagra. That on Plague gives a condensed history of the disease from the earliest times. It strikes us as somewhat amusing, in reading this section, to find Rufus of Ephesus referred to as "Dr" Rufus—probably an unnecessary act of courtesy on the part of the printer. The history of plague in Egypt since 1898 to the present time contains in a brief space facts and figures which could only be gathered by laborious search through a mass of periodical literature. No one engaged on the study of ankylostomiasis and Bilharziosis can well afford to overlook Dr Sandwith's account of these diseases as seen in their home.

The book is written in an easy, unconventional, interesting style, and, apart from strictly scientific matters, contains much valuable information respecting the medical theories, customs, and methods of treatment prevailing among the native races.

Clinical Methods: A Guide to the Practical Study of Medicine. By ROBERT HUTCHISON, M.D., F.R.C.P., and HARRY RAINY, M.A., F.R.C.P.Ed., F.R.S.E. Third edition, thoroughly revised. Pp. 634, with upwards of 150 illustrations and 9 coloured plates. London: Cassell & Company, Limited. 1905. Price 10s. 6d.

THE general practitioner and the medical student have no reason to complain of the lack of written guides to the making of diagnoses. It is evident that complete and disciplined method is essential in the application of clinical knowledge. Most of the errors in diagnosis result from the incomplete manner in which cases are investigated. That student or young practitioner is wise who begins his life-work with a clear appreciation of clinical methods, and who steadily and unswervingly employs them in spite of temptations to hurry. Year by year new diagnostic means are given to the medical world by

numerous observers, and the application of these is often of great value.

The object of this volume on clinical methods is to assist the student to investigate his case. It is not intended to be a treatise on medical diagnosis. The whole work is really the expansion of the first chapter, which treats of case-taking in general. Having brought forward in the first chapter the various abnormalities which might be found in the course of case-taking, the authors then proceed chapter by chapter to the specific investigation of the systems of the body, and every point of deviation from the normal is clearly, briefly, and skilfully handled.

This new revised edition of September 1905 has 82 pages added to the reprint of 1894, and a number of valuable illustrations, all of which are helpful to explain the text.

In the selection of new material, due consideration has been given to its probable permanent value.

The chapter on Blood gives special indication of new work. Recent methods are explained and new instruments are illustrated. Tallqvist's method of estimating hæmoglobin, which has the value of simplicity, easy application, and reasonable accuracy, is described. The sections on the Making, Fixation, Staining, and Examination of Blood-films have received useful additions.

In Chapter vi., which deals with the Respiratory System, fuller explanations have been given of various methods. The phenomenon known as Litten's "diaphragm sign" is described, and the plans to elicit the "sign" are given.

Notice is taken of the mapping out of the limits of the lungs and of their lobes by means of a vibrating tuning-fork. The stem of the tuning-fork ends in a small plate which is placed upon an interspace in the front of the chest; and at the same time the observer auscultates posteriorly with an ordinary stethoscope. A marked difference can sometimes be observed in the note when the stethoscope passes from one lobe to another. Post-tussive suction is noted and its significance explained.

This chapter deserves the highest praise in every respect. It is compact, clear, and contains the latest information on methods of examination of lung and sputa.

Many new and valuable additions are observed in Chapter vii. on Urine. Much labour has been employed to bring its information abreast of the present day. The authors are to be congratulated on their industry; and the reward is that they supply the practitioner or the student with a valuable guide to urinary diseases.

Holt's table, which finds a place in this chapter, gives the total amount of urine passed by an infant in the first twenty-four hours, in the second twenty-four hours, then three to six days, and in various subsequent periods of the child's life up to the age of fourteen years.

The method of estimating the purin bodies by Walker Hall's *Purinometer* is explained.

Two plans are given to separate albumin from globulin; Brandberg's method is recommended as being the simpler for clinical purposes, and as being sufficiently exact.

Among the tests for sugar in the urine, Nylander's (or Bütger's) test is added. This test, which is extremely delicate, depends on the capacity of glucose to reduce bismuth compounds in alkaline solution, with the formation of black suboxide of bismuth. Gerrard's cyano-cupric method is also detailed, and the principles on which it depends are explained.

Boston's method is given for permanently preserving tube casts found in urine.

The whole of this chapter is interesting and informing, and is worthy of careful study.

The value of Chapter ix. on the Nervous System has been enhanced by the introduction of the latest knowledge on the anatomy and physiology of the nervous system. New examination methods are given in the various sections. Kernig's sign is illustrated and described, and its significance explained.

Two new illustrations are given to show the motor points of the trunk anteriorly and posteriorly. They will be of service in the electrical examination of the trunk.

Chapter x., which deals with the Examination of the Eye, Ear, Throat, and Nose, has been carefully revised.

Chapter xiv., on Clinical Bacteriology, has been revised and in part rewritten by Dr James Beattie, Lecturer on Bacteriology in Edinburgh University. He has brought this chapter into close touch with the newest information regarding micro-organisms; and he has detailed in helpful ways the various recent methods of staining and microscopic examination of prepared specimens. This chapter gives valuable assistance to those who desire to carry out their own microscopic examinations on bacteriology.

We recommend the third edition of Hutchison's and Rainy's "Clinical Methods." The illustrations are capital, and the volume is practical, and handy in form and size. It ought to be in the possession of every practitioner or medical student, and should be frequently consulted by them.

The Food Factor in Disease. By FRANCIS HARE, M.D. 2 vols., pp. 973. London: Longmans, Green & Co. 1905. Price 30s. net.

THE author describes this work as an investigation into the humoral causation, meaning, mechanism, and rational treatment, preventive and curative, of the paroxysmal neuroses (migraine, asthma, angina pectoris, epilepsy, etc.), bilious attacks, gout, catarrhal and other affections, high blood-pressure, circulatory, renal, and other degenerations.

In his preface Dr Hare quotes the statement of Buckle that the tendency in his day was to accumulate facts to the exclusion of ideas. In vain was the demand that they should be generalised and reduced into order. The indefatigable industry of this (nineteenth) and the preceding century had given us possession of a large and incoherent mass of observations which had been stored up with great care, but which, until they were connected by some presiding idea, were utterly useless.

Dr Hare then asks whether Buckle's indictment as regards medicine at least is altogether undeserved at the present day. One is, however, appalled at the size of the two volumes (973 pages) which Dr Hare finds necessary to contain his generalisations of the facts relating to food and disease. He attempts to take a deductive view of disease, to approach the solution of pathological problems from the side of physiology. He has had to frame many hypotheses, some of these firmly established by fact, others in which the basis of fact is slender, while a few are unsupported by fact. The author, however, affirms that imaginative methods are not capable of serious injury to medical science.

It seems to us that the entire work is an argument to prove that most of the diseases to which flesh is heir are due to an accumulation in the blood, "to an ultra-physiological degree, of carbonaceous material." To this condition Dr Hare gives the name of "hyperpyræmia" (Gr. pureia-fuel). The author says that at first the theory was purely provisional and suggested by a few therapeutic observations, but it soon ceased to be so when seriously entertained, and it was soon found to explain a large number of clinical observations otherwise unexplained.

Physical exercise and abstinence from food would tend to relieve this "carbonaceous accumulation," and Dr Hare cites numerous cases from other practitioners of the cure of migraine and asthma by such means. Exercise operates by dispersing hyperpyræmia through greatly increasing the combustion of carbon and the consequent output of carbonic acid gas.

Menstruation also, according to the author, depends on a tendency to continuous accumulation of carbonaceous material in the blood. This accumulation is demanded by the preponderating anabolic functions of the mature female, it is devoted to the anabolism of the offspring or, in the absence of conception, it is discharged at regularly recurring intervals or menstrual periods. The attacks of the paroxysmal affections (asthma, epilepsy, angina pectoris, gastralgia, gout, etc.) are all especially prone to arise between midnight and five o'clock in the morning. Dr Hare states that his theory of hyperpyræmia explains this predilection for these small hours. Carbonaceous accumulation tends to vary inversely with the rate of combustion and the output of carbonic acid gas. It is during the small hours that the rate of combustion and the output of carbonic acid gas sink to the minimum. In the same way he explains the causation of lithæmia, the gouty, arthritic, or herpetic diathesis, larvaceous(?), irregular, abarticular, suppressed or concealed gout, arthritism, uricacidæmia, etc. Dr Hare thinks that we shall come to believe, from a study of the theory of hyperpyræmia, that pathological action is, for the most part, but an exaggeration of or modification of physiological action equally "purposive," though less accurately adaptive, and therefore less economical, more damaging, and perhaps as a rule less successful.

It is impossible for us to give even an outline of the wide range of subjects over which the author wanders, but sufficient has been indicated to prove that the whole work is an excellent example of hyperpyræmia as applied to literature. It is a long drawn out argument to prove the author's theory, and the work might have been more convincing had the author practised what he advocates, namely, physical exercise in the way of deletion and abstinence as regards redundancy, so as to have condensed his book into more reasonable limits. We cannot agree with the author that most of the diseases he mentions are due to the one condition of the blood on which he lays so much stress.

Dr Hare has read widely, and his references are numerous and full, and a copious index both to authors and subjects makes verification easy. The author is to be complimented on his assiduity in compiling so many facts, though we doubt whether his conclusions will carry conviction.

Organotherapy; or Treatment by Means of Preparations of Various Organs. By H. BATTY SHAW, M.D., F.R.C.P. (Lond.), Lecturer in Therapeutics, University College, London, etc. Pp. 256. London: Cassell & Co., Ltd. 1905. Price 6s.

THIS volume forms one of a series on modern methods of treatment. It is divided into five sections, which deal respectively with the thyroid and parathyroid glands, the suprarenal glands, the alimentary tract including the pancreas and liver, the genito-urinary organs and other organs and tissues. Each section opens with an account of the anatomy and physiology of the organs under consideration, and thereafter pathology from the point of view of organotherapy is discussed, and then the *pros* and *cons* for the administration of the organ, its preparations and dosage are taken up.

It would be easy to point out omissions in the account of the physiology of the ductless glands, but considering the enormous literature and the space at his disposal the author's selection of facts seems most judicious. An enormous amount of material is brought under review in the field of therapeutics. More than half of the book is taken up with the consideration of the thyroid and suprarenal glands. Some readers may complain that the work is too much a compendium of literature and that the author does not sufficiently dogmatise regarding the therapeutic value of the organs discussed. In our opinion the time for that is not yet come, and the author is to be congratulated on his judicious attitude, and on the enormous amount of material he has assimilated and arranged so clearly and so readably. Regarding the use of the serum or milk of thyroidectomised animals in exophthalmic goitre, it is stated that "at the present moment it is impossible to form any opinion on the usefulness of such remedies. The absence of harmful manifestations encourages the extension of the treatment."

The thyroid treatment of eclampsia is said at least to support the more ordinary methods, owing to its diuretic effect, whether the theory of thyroid or parathyroid insufficiency be correct or not. The notes on the thymus are somewhat scrappy and Beard's view as to its function is not quite correctly stated. That view is not merely that the thymus gives origin to leucocytes "like," but *before* other lymphoid tissue. We think the bone-marrow merits a more full consideration than is given in the two pages devoted to it, and we do not find any reference to the important experiments of Fowler, which were recorded in this journal. On page 99 we notice "conditionns," on page 75 the

injection of "juice-muscles" is referred to, and throughout the book the Wolffian bodies are spelt "Woolfian." The volume is of convenient size and is well printed and bound.

Wounds in War: the Mechanism of their Production and their Treatment. By Surgeon-General W. F. STEVENSON, C.B. A.M.S. Second edition. Pp. 505, with 127 illustrations. London, New York, and Bombay: Longmans, Green & Co. 1904.

SURGEON-GENERAL STEVENSON'S book on Military Surgery—a term to which the author thinks exception should not be taken—is so well known that a second edition, which incorporates the experiences gained in the Boer War, will be welcomed by surgeons, whether military or civilian. The peculiarities of gunshot wounds, and the circumstances under which they have to be treated during a campaign, are very different to those in civil life, and it is owing to this that active service experience is so valuable in the training of military surgeons for their work in war. On the other hand, as the author indicates, the civil surgeon who had experience in the Boer War of gunshot wounds must have benefited by it, and be better equipped to treat injuries which occur in civilian life.

The greater part of this work is devoted to the study of injuries produced by projectiles. The characteristics of these injuries naturally depend upon the nature of the projectile and the form of rifle or gun which is used; but in addition, great variability in the nature of the wound results from the consistency of the part struck and the velocity of the projectile. These causes of variability are discussed at considerable length, and the author shows a very thorough knowledge of the subject, both from the practical and experimental side. The views regarding the effects of modern small-bore bullets have been much modified by the experience of surgeons in the South African War, and Surgeon-General Stevenson brings this very vividly before the reader. Thus conservative treatment is possible in very many injuries, especially those affecting large joints, and the rule which used to be amputate in these cases, is now just as certainly do not amputate.

In a review it is impossible to direct attention to the numerous changes in opinion and practice which the results of surgery in the Boer War produced, and to which the author of this work refers in very considerable detail. After a general consideration of military surgery, as has been indicated, he takes up the various

regions of the body, and by examples which have been described by other surgeons, or seen by himself in the war, he brings before us in a convincing manner the best method of treating injuries in these regions, more particularly, in this connection, the portions of the book devoted to the skull, spine, and abdomen are worthy of careful perusal. In the two former regions military surgery does much as in civil practice; but in abdominal surgery this is not so, and the explanation of this divergence is not difficult to appreciate. It really depends upon the surroundings of the patient at the time of injury, and the impossibility of providing the necessaries for successful operation in civil hospitals upon the field of battle. The operation must be immediate or it is too late.

A chapter upon X-ray work is partly written by Dr Mackenzie Davidson, and is valuable.

This work is full of most interesting and instructive information, and should be read by civil surgeons as well as by surgeons in the Services. It is a pleasure to find that Surgeon-General Stevenson has been able to incorporate so much of the experience gained in the Boer War with the older work of surgeons whose experience was derived mainly in the Crimea and the American Civil War.

We heartily commend this work to all of those who may have to deal with gun-shot wounds.

Dental Surgery: including Special Anatomy and Pathology. A Manual for Students and Practitioners. By HENRY SEWILL, M.R.C.S., L.D.S.Eng., Past-President of the Odontological Society of Great Britain; formerly Honorary Dental Surgeon to the West London Hospital. Fourth edition, edited by W. J. ENGLAND, L.D.S.Eng., and J. SEFTON SEWILL, L.R.C.P., M.R.C.S., L.D.S.Eng. Pp. 622. London: Baillière, Tindall & Cox, 8 Henrietta Street, Strand. 1901.

THIS book, now some years old, has been sent for review to combat the statement made in our August number that a book then under review was, so far as we were aware, the only one in the English language that made an attempt to present the subject of Dental Surgery in such a manner as to be of special value to the general medical practitioner. We were quite aware of the existence of Mr Sewill's book, and we still maintain the truth of our statement; for, excepting that the book is some-

what smaller, we fail to see how his is any more especially suited for the requirements of a medical man than are those of, say, Tomes, and Smale & Colyer. Such a book as we indicate should, in our opinion, almost ignore many matters of every-day importance to the dentist, such as the permanent filling of teeth, and details of the treatment of irregularities and of the making of artificial substitutes; whilst a very full account of dental prophylaxis, of means to relieve pain, whether by means of drugs or by operation, and of the sequelæ, both local and general, of dental defects, and so on, would be most appropriate.

Viewing the book, then, from a general standpoint, it is too small to be of any value to the dental practitioner, who will consult special text-books, and its scope seems far more suitable for the needs of a junior dental student, were it not that he is nowadays fairly well educated, and would not, we think, appreciate the somewhat involved literary style, the want of proper punctuation, and the large number of mis-spellings, which is quite inexcusable in a book that has reached its fourth edition.

The illustrations are very variable—many are excellent, but some are poor.

Turning to the teaching of the book, the subject of Irregularities naturally occupies many pages and, as usual in English text-books, is very disappointing. We quite admit that teeth can be moved and appearances improved by the old, clumsy, cruel methods, provided patient and guardians will submit long enough, but it is astonishing that in spite of the enormous advance that has been made in this subject in America, British dentists should to such a large extent be content with classifications and methods of treatment that should have been obsolete more than ten years ago.

The chapter on Caries is probably the best in the book, and, although we would take exception to several statements therein, we content ourselves with the opinion that quite insufficient stress is laid on the fact that the acid factor in the causation of caries is of purely local production at the site of the caries, and that any general acidity of the saliva can in this connection be only of very secondary importance. We are surprised to learn that excision as a treatment of caries is still "commonly resorted to." The operation was the logical outcome of an illogical theory of caries, and the practical results do not justify the space devoted to it. The belief that "pulp stones" and "exostosis" are sources of local and of referred pain apparently still obtains—surely it is more rational to consider these new formations and the pain as concomitant results of a chronic inflammatory process, and not themselves cause and effect. The frequent advice to leave carious milk teeth unfilled is unfortun-

ate—such teeth should have fully contoured fillings inserted, if only to ensure the permanent teeth erupting in their proper positions.

Under Glossitis, a page is devoted to some sort of description of a very rare acute condition running on to abscess formation, but no mention is made of a far more common chronic superficial condition running on to cancer.

We were under the impression that the question as to whether "micro-organisms" were animal or vegetable cells was settled twenty years ago in favour of the latter, but apparently the authors hold otherwise.

Quite apart from all medical considerations, it is shocking to read the disgusting advice that the condition should be left alone where teeth are so loose and covered with tartar that removal of the latter would probably ensure loss of the teeth—the general medical practitioner at least will not need to be told that such tartar and teeth should be removed without a moment's hesitation.

Just one more general criticism. The sections on acute Maxillary Sinusitis are not satisfactory, and a very good example of the irrationality of the book is exemplified in the treatment by means of a hollow gold tube which the authors admit performs no function as a drain, since it projects well into the antrum and its lumen is plugged with a gold split pin—"the pus escapes freely by the sides of the tube." Then why not a solid plug, which is cheaper and far simpler, especially as the authors are quite agreeable to the removal of the plate when syringing?

Such criticisms might be largely extended, and whilst not denying that the book may have its good features, they are very much overshadowed by serious defects.

Mucous Membranes, Normal and Abnormal, including Mucin and Malignancy. By WM. STUART-LOW, F.R.C.S. Pp. 55. London: Baillière, Tindall & Cox. 1905.

THIS small work consists of a lecture originally delivered to the students of the Polyclinic College. The author at first refers to the general view that mucus is the bane and bugbear of the physician, and requires every effort to be put forth for its removal, and then proceeds to show that it is, on the contrary, of the first importance in the animal economy. He details the position of structures which secrete mucus, and describes the anatomical arrangements which determine its flow and ultimate

destiny, and then insists upon the important part it plays as a protector of the internal surfaces of the body. The various changes that may occur in mucus and mucous membranes in diseased conditions are referred to under the following terms: orthomyxia, myxasthenia, metamyxia, hypomyxia, paramyxia, etc., and these conditions are described and the methods suitable for their treatment discussed. Lastly, the relation of mucin and malignancy is considered. At the outset, it is stated that three-fourths of all cancer in man occurs in the alimentary canal, and then attention is directed to the fact that where mucus normally is least abundant, malignant disease is most frequent, as, for instance, at the junction of skin and mucous membranes, and *vice versâ*. In this relation the influence of tobacco and salt are referred to, each producing hypomyxia, that is, a diminution in the amount of mucus secreted.

This is a suggestive book, but the author fails to bring forward sufficiently convincing evidence of the relation between mucus and cancer. It is, however, especially at this time, when the etiology of cancer is the subject of so much inquiry, interesting to have new ideas on the subject, and Mr Stuart-Low is to be congratulated upon producing a new view, even if erroneous, with regard to the subject.

The Practice of Obstetrics, designed for the use of Students and Practitioners of Medicine. By J. Clifton Edgar, Professor of Obstetrics and Clinical Midwifery in the Cornell University Medical College. Second edition, revised. Pp. 1152. London: Rebman, Ltd. 1904. Price 30s.

The fact that a second edition of this work was called for within four months of the publication of the first is sufficient evidence of its appreciation by "the students of obstetrics whom it has been my privilege to instruct," to whom it is dedicated. With a wide and exact knowledge of details the author combines a power of lucid statement and systematic arrangement, which places this book in the forefront of students' manuals. The illustrations are numerous and artistically reproduced; and, while everything that can be shown graphically is represented, they are subservient to the text.

It is noteworthy that in preparing this second edition the subjects that have called for revision are the toxæmia of pregnancy and morbidity in the puerperium. For it is to these that at present the attention of the scientific obstetrician is directed.

The toxæmia of pregnancy has only of recent years been carefully studied, and promises to give a more satisfactory explanation of the nausea and vomiting, the convulsions and coma to which the pregnant state is liable. Professor Edgar rightly considers these together, and we commend his summary of research in this direction, and the clear exposition of the present state of our knowledge, to the reader.

Puerperal morbidity and its prevention is a subject to which he has directed special attention, as is shown in his having devised an aseptic obstetric case. He begins the section on the management of labour with these wise words: "Imitation of Nature is the key to the management of normal labour. By management is not meant interference, but watchful observation. . . . It is scarcely an exaggeration to state that the greater proportion of the morbidity, if not the mortality, of childbirth is due to the careless and unskilful management of normal labour"; and he contrasts the natural process with management as follows: "Nature's processes in labour are from within outwards . . . the fœtus passes from the clean to the relatively clean, and finally to the unclean. . . . While all Nature's processes are from within outwards and conservative, from the sterile toward the septic, manipulation on the part of the obstetrician must necessarily be from without inwards, from the unclean toward the clean. . . . Hence the importance of non-interference, except in the presence of a positive indication."

This new edition gives the most comprehensive and lucid account of morbid conditions originating in the puerperium to be found in any English text-book. Taking as the criterion of morbidity a temperature of 100.4° F. (38° C.), an average morbidity is given for Paris cliniques of 11 per cent., for certain German cliniques of a little over 13 per cent., and for 2200 cases collected by Professor Edgar of 18.4 per cent. Of these last the cause was non-septic in 79.5 per cent. (mostly constipation), sepsis in 13.5 per cent., and unknown in 6.9 per cent. The conditions are classified according as they antedate labour, result from it, or originate or first appear in the puerperium. In considering the bacteriology of puerperal morbidity the statement is made that "the claim that the vaginal secretion of the healthy woman, whether pregnant or not, is essentially sterile and bactericidal, appears to be untenable." And Winckel's "Handbook of Obstetrics" is quoted as favouring the idea that the same germ content is common to the different sections of the genital tract. Here two things are confused. While it was held that it was destructive of certain micro-organisms, the vaginal secretion was not considered sterile. And the article by Menge in Winckel's "Handbook" is by no means reactionary, but is based on the bacteri-

cidal action of the vaginal secretion. The account of the changes in the uterus in saprophytic endometritis is remarkably good, as also that of the struggle between micro-organisms and defensive forces, in the simple pyogenic or infectious endometritis. In discussing treatment, he considers that the curette does more harm than good, with which we entirely agree. While useful in abortion, it is worse than useless in removing débris from the full-time post-partum uterus. This is best done with the finger, and the curette destroys the natural barrier against infection without necessarily removing the infective matter. Enough prominence is not given to intra-uterine injections, or uterine irrigation as it is called, in the treatment of puerperal sepsis.

Clinical Obstetrics. By ROBERT JARDINE, M.D. Ed., M.R.C.S. Eng., etc., Professor of Midwifery in St Mungo's College, Glasgow; Senior Physician to the Glasgow Maternity Hospital, etc. Second edition. Pp. xxviii. + 609, with 96 illustrations and a coloured plate. London: Rebman, Limited; New York: Rebman Company. 1905.

PROFESSOR JARDINE'S "Clinical Obstetrics" has made its way to a second edition. New illustrations have been added, and new illustrative case-records make it still more emphatically a clinical work of outstanding merit. The portion dealing with eclampsia has a great wealth of clinical material, and the author's method of dealing with this dire complication of pregnancy and labour is well set forth. Enriched as it is with the experience gained by the author during his connection with the Glasgow Maternity Hospital, the book is one to which the obstetric physician may profitably refer. In its present form, with an enlarged page and better paper, it is an advance upon the first edition.

Public Health Administration in Glasgow: A Memorial Volume of the Writings of JAMES BURN RUSSELL, B.A., M.D., LL.D., Medical Member of the Local Government Board for Scotland, and formerly Medical Officer of Health for Glasgow. Edited by A. K. CHALMERS, M.D., Medical Officer of Health for Glasgow. Pp. 612. Glasgow: James Maclehose & Sons, 1905. Price 7s. 6d.

DR RUSSELL was a man of outstanding distinction in the Public Health Administration of Scotland, and this memorial

volume of his writings forms an appropriate reminder of the varied scope, the valuable suggestions, and the vivid substance of his contributions to the literature and practice of his subject. This collection of his papers originated in a suggestion made by Sir William Gairdner, his predecessor as Medical Officer of Health for Glasgow, and has been edited by Dr A. K. Chalmers, his successor in that office. Sir William Gairdner contributes a preface in appreciation of the work of Dr Russell, and points out the qualities which rendered him a model for all future sanitary officials. Next the editor has inserted a biographical note with an account of the chief features of Dr Russell's life and work. This is followed by a list of his published papers, numbering eighty. The task of selecting and arranging those which should be reprinted in this volume can have been no easy one, and must have involved much thoughtful labour. This has fallen to the lot of Dr Chalmers, who has skilfully succeeded in so grouping the papers as to present a sanitary history of Glasgow during the nineteenth century. Commencing with the evolution of the function of public health administration, its development and results are traced as exemplified in Glasgow during Dr Russell's tenure of office. A chapter is devoted to the history of hospital accommodation for infectious diseases in Glasgow, showing how it originated, and how the conception gradually arose that the local authority is responsible for the care of all such cases. No portion of the book is more interesting than the numerous papers dealing with all aspects of the housing problem. The evil effects of overcrowding and of insanitary dwellings are fully illustrated in a series of excellent papers. Other chapters contain studies on epidemiology, clinical phenomena, vital statistics, the prevention of tuberculosis, disinfection, and meat infection. Each and all are valuable essays, both readable and instructive.

The whole volume is a distinct acquisition to the literature of public health, and should be in the possession, not only of all medical officers of health, but of all those interested in sanitary science. It is a worthy memorial of a devoted sanitarian, whose work lives after him. Its value to the nation will be the better appreciated for the rare fidelity and success with which the editor has prepared this selection of Dr Russell's writings.

Hygiene and Public Health. By B. ARTHUR WHITELEGGE, C.B., M.D., B.Sc. (Lond.), F.R.C.P., D.P.H., and GEORGE NEWMAN, M.D., D.P.H., F.R.S.E. New edition, revised, enlarged, and in great part rewritten. Pp. 636, illustrated. London: Cassell & Co., Ltd. 1905. Price 7s. 6d.

THIS useful manual has in the present issue reached its tenth edition, and Dr Whitelegge has assumed Dr George Newman as joint-author in its production. The authors have succeeded in their endeavour to make the manual a concise summary of the laws and science of Public Health at the present time. Indeed its very conciseness leads in places to rather abrupt transition from one statement to another. The contents have been thoroughly revised, and many sections rewritten. Recent epidemics are cited, such as the Lincoln outbreak of enteric fever in the early part of this year. The illustrations are perhaps the least commendable portions of a satisfactory handbook. Misprints occur here and there which ought to have been noticed in the correction of proofs, *e.g.* on page 16 "dioide" for iodide, and on pages 60, 88, 334, and 504 there are similar errors. Moreover, there are two illustrations numbered 23. These are but slight blemishes on a good book, which includes in small compass an excellent epitome of Public Health in both its scientific and administrative aspects.

Sanitary Laws of Scotland and Principles of Public Health, being a Manual for County and Burgh Councillors, Legal Officials, Medical Officers of Health, Sanitary Inspectors, and all interested in Public Health. By W. J. BROCK, D.Sc. (Public Health), M.B., C.M., F.R.S. (Edin.), F.F.P.S. (Glasg.), Medical Officer of Health for Midlothian, West Lothian, and Peeblesshire. Pp. 480. Edinburgh: Oliver & Boyd. 1905. Price 7s. 6d. net.

THE author presents in this neat volume no mere synopsis of the sanitary laws applicable to Scotland. It contains, with some annotations, the full text of the main statutes, such as the Public Health (Scotland) Act 1897, and excerpts are included from other Acts which contain provisions relating to sanitation. A very large portion of the book consists of copies of legal enactments, of regulations, memoranda, circulars, and orders issued by the Local Government Board, and of tabular forms for the returns expected from Public Health officials. Those concerned in the administration of Public Health in Scotland will

appreciate the convenience of having all this information collected together and reprinted in a size suitable for the pocket. An important section of the book is an appendix of Scottish and English legal decisions on Public Health questions. This is contributed by Mr A. J. Louttit Laing, M.A., LL.B., advocate, and will be extremely useful to any medical officer of health or local authority contemplating proceedings in cases similar to those already decided.

In a series of appendices, Dr Brock discusses sundry subjects connected with Public Health, such as the prevention of infection, vital statistics, food, water, air, and ventilation. Of these sections, that on vital statistics is the most complete, but might have been brought more up to date. The prevention of infection is dealt with under several headings which cover the procedures necessary for this object. On the subject of isolation of the sick, Dr Brock quotes very largely from the opinions of those who are adverse to the use of isolation hospitals in the treatment of scarlet fever. In a work intended for the laity, it would have been advisable to balance more equally the arguments on a subject still under discussion.

The handbook concludes with a copious index, which facilitates reference to subjects dealt with by more than one Act. Dr Brock has provided in a compact form the sanitary laws of Scotland, and the book will be specially useful to the various Local Authorities throughout the country.

A Text-Book of Materia Medica for Students of Medicine. By C. R. MARSHALL, M.D., Professor of Materia Medica and Therapeutics in the University of St Andrews. Pp. 635. London: J. & A. Churchill. 1905.

"THE object of this book is to serve as a guide to the British Pharmacopœia, and as an introduction to pharmacology and therapeutics." This book is an excellent guide to the British Pharmacopœia. The facts are clearly and succinctly stated.

The arrangement of the work is good. The author has succeeded in lightening the labours of the students by putting the less important matter into small type, distinguishing between the more important and less important ingredients in preparations, printing the principles of crude drugs which it is necessary to remember in heavy type. The book contains many illustrations, and these are, as a rule, very accurate, although this can never be a substitute for the Materia Medica Museum. With regard to the pharmacology and therapeutics of the book, most

students will find it too brief, and in any future edition this part might be expanded, which the author is so well able to do.

A most valuable part of the book is contained in an "Appendix" on the "Indian and Colonial Addendum" to the British Pharmacopœia.

Materia Medica and Therapeutics: An Introduction to the Rational Treatment of Disease. By J. MITCHELL BRUCE, M.A., LL.D., M.D., Fellow of the Royal College of Physicians of London, Consulting Physician to Charing Cross Hospital, etc., etc. New and enlarged edition, revised throughout, and containing the Indian and Colonial Addendum to the British Pharmacopœia. *Forty-seventh Thousand.* Pp. 632. London, Paris, New York, and Melbourne: Cassell & Company, Limited.

Dr MITCHELL BRUCE'S work on Materia Medica and Therapeutics has long been known as a standard work on these subjects, and has for many years been a favourite text-book for students.

In the present edition the work has been subjected to thorough revision, and brought up to the level of our latest knowledge.

An additional value is given to the book from the fact that it contains an excellent account of the Materia Medica and Therapeutics of the drugs of the "Indian and Colonial Addendum to the British Pharmacopœia."

Massage des Membres. By Dr DAGRON, ancien interne des hôpitaux, ancien aide d'anatomie à la Faculté. 8vo, pp. 484, with 101 illustrations in the text. Paris: G. Steinheil. Price 12 francs.

THE book appears under the Ægis of the "École Massothérapique de l'Hôtel-Dieu; Service de M. le Dr J. Lucas-Championnière." From such a source one expects the subject to receive scientific and logical treatment, an expectation which a perusal of the volume does not disappoint.

In his Introduction the author complains that, in spite of Championnière's work, massage is still regarded as a means of getting rid of the stiffness resulting from some modes of treating fractures, sprains, etc., rather than as in itself a method of treating such injuries.

Dr Dagron claims that massage is of use at every stage in regard to fractures: it aids diagnosis, it aids the reduction of displacements, and is a most valuable adjunct to all methods of treating fractures.

The book is divided into two parts: the first, after briefly touching on the history of massage, its effects on the tissues, and some contra-indications to its use, is devoted to explaining in detail the technique. The author maintains that the hand is the best instrument for massage, and further he lays down as an axiom that medical massage should be carried out by specially trained medical men, and also that every follower of the art of massage must realise that it is not necessary *vaincre* but *convaincre* the muscles.

Dr Dagron is no believer in multiplicity of procedures and movements, and rightly holds that the value of a séance depends not on the number and variety of the procedures employed, but on the successful fulfilling of the principles indicated in the treatment and in the progress achieved.

The second part of the book is divided into chapters dealing with different regions. After recalling briefly the anatomy and physiology of each region, the author describes the massage procedures common to the region; he then details the traumatisms and acute and chronic affections which may be found in the region, and their treatment from the point of view of massage. In this section of the book many readers will find points upon which they cannot agree with the author, but no reader will find any difficulty in understanding the author's views, which he explains lucidly, detailing his technique and supplementing the letterpress with illustrations.

The anatomical and physiological element in the second part of the book and the very full explanations of the objects and technique of the procedures advised, renders the book not only a full monograph for those already skilled in the art, but also a complete guide and text-book for those beginning the study of massage.

List of Books Received

From Smith, Elder & Co.

Practical Zoology. By Marshall and Hurst. Price 10s. 6d. net.

From Cassell & Co.

Clinical Methods. By Robert Hutchison and Harry Rainy. Price 10s. 6d. net. Third Edition.

A Manual of Chemistry. By Arthur P. Luff and Frederic J. M. Page. Price 7s. 6d. net.

Hygiene and Public Health. By B. A. Whitelegge and George Newman. Price 7s. 6d. net.

Materia Medica and Therapeutics. By J. Mitchell Bruce. New Edition. Price 7s. 6d. net.

Organotherapy or Treatment by means of Preparations of Various Organs. By H. Batty Shaw. Price 6s.

From J. Wright & Co.

Ambulance Examination Questions. By D. M. Macdonald. Price 6d. net.

Golden Rules of Sick Nursing. By W. B. Drummond. Price 1s. net.

From Sidney Appleton.

The Principles and Practice of Medicine. By William Osler. Sixth Edition. Price 21s. net.

Diagnostics of Internal Medicine. By G. Reeve Butler. Second Edition. Price 25s. net.

Diseases of Infancy and Childhood. By L. Emmett Holt. Third Edition. Price 25s. net.

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THE SCOTTISH
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RECTAL ALIMENTATION

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RECTAL alimentation is so universally in use in clinical medicine that it is surprising that at the present day we have not satisfactory and accurate data on which to gauge its value; for while a good deal of work has been done on the subject, much of it is unsatisfactory in the light of modern methods. Though rectal feeding dates back to the days of Galen, Voit and Bauer seem to have been the first to carry out exact observations. It is, however, the work of Leube and of Ewald which has been accepted as the basis on which most statements have been made as to its value. As the results obtained by these observers seemed to us unconvincing in certain respects, the following observations were undertaken with a view to gauging, if possible, the influence which this mode of alimentation has upon the metabolic processes of the body.

Methods.—The observations were carried out on patients suffering from gastric ulcer, when a period of complete gastric rest seemed necessary as a therapeutic measure. The patient was prepared for treatment by the administration of a brisk purge along with a dose of charcoal. When the charcoal appeared

in the stool, it was considered that the alimentary canal had been emptied. Between the giving of the aperient and the commencement of rectal feeding, no food was allowed by the mouth; the patient was kept absolutely at rest in bed. The rectal nourishment selected was given in the form of an enema every six hours, four being thus given in the twenty-four hours. At the end of every period of twenty-four hours the bladder was emptied, and the rectum washed out with a simple water enema. The nutrient enemata were made up in bulk by a firm of wholesale chemists, divided by weight, and cinnamon water or chloroform water used as a preservative. When chloroform was used, it was dissipated before administration by placing the uncorked bottle containing the injection in warm water for an hour. Two sample bottles of each of the different series were taken for estimation of the constituents (nitrogen, fat, and sugar) of the enema. Before administration, in the cases in which eggs were used, the enemata were pancreatised. When milk was used it was pancreatised and sterilised, and a sample taken for estimation of the constituents. Milk sugar was inverted before estimation by Fehling's method. The urine and bowel contents were carefully collected. The nitrogen estimations were carried out by Kjeldahl's method. The nitrogen of the bowel contents and of the enemata, except in the first observation, was estimated on the dried material, two estimations of each being made and an average obtained. If there was any distinct discrepancy in the two results, the estimation was repeated.

The fats were estimated by weight after extraction with ether in Soxhlet's apparatus.

To determine the sugar, a sample of the bowel contents was taken, animal charcoal added, and the whole heated to precipitate albumin. Filtration gave a colourless fluid, in which the sugar could be estimated by Fehling's method.

The patient's weight was determined every third day.

Much difficulty was caused with female patients by the incident of menstruation. Rectal feeding seems to have a very marked influence in inducing menstruation even when the period is not due. A large number of our observations broke down owing to this cause, and are not used as data in this paper.

Observation I.—A fairly well nourished young woman. Symptoms of gastric ulcer lasting over several years. Put on rectal feeding after brisk purgation and twenty-four hours' starvation.

Rectal feeding for six days.

Enema : Two eggs.
Dextrose.
10 c.c. Cod liver oil.
Normal saline solution.

Enemata well retained.

After six days, all pain having disappeared, milk was given by the mouth. Patient appeared well and comfortable during period of rectal feeding. Recovery was uninterrupted.

OBSERVATION I.

Day.	Enemata.			Excretion.				Weight of Patient in Kilogrammes.
	Nitrogen.	Fat.	Sugar.	N. of Fæces.	N. of Urine.	Fat.	Sugar.	
I.	11.56	104.37	47.75	10.73	4.66	67.06		51.529
II.	11.56	104.37	47.75	12.39	3.38	78.00	3.22	
III.	11.37	102.88	47.75	8.97	3.64	51.03	2.68	
IV.	11.37	102.88	47.75	8.04	2.63	38.87	4.00	
V.	11.37	102.88	47.75	8.41	2.66	46.28	8.08	
VI.	11.37	102.88	47.75	10.80	2.69	63.90	5.71	49.259
Totals	68.60	620.26	286.50	59.34	19.66	345.14	23.69	Loss in weight 2.27 kilos.

Day.	Nitrogen absorbed.	Nitrogen of Urine.	Nitrogen from Tissues.	N. Value as Proteid of Tissues.
I.	0.83	4.66	3.83	23.93
II.	−0.83	3.38	4.21	26.31
III.	2.40	3.64	1.24	7.75
IV.	3.33	2.63	−0.70	−4.37
V.	2.96	2.66	−0.30	−1.87
VI.	0.57	2.69	2.12	13.25
Totals	9.26	19.66	10.40	65.00

Caloric value of material metabolised per diem as average over period :—

Proteid.	Calories.	Fat.	Calories.	Sugar.	Calories.	Total Calories.
9.62	39.46	45.85	426.40	43.80	179.58	645

Observation II.—Well nourished young woman, aged 20. Chronic gastric ulcer with slight gastric dilatation.

Enema : 2 eggs.
20 grm. dextrose.
NaCl.
Chloroform water to 300 c.c.

Enemata fairly well retained. On third day of rectal feeding some headache and sickness but no vomiting. After period of gastric rest, convalescence uninterrupted.

OBSERVATION II.

Day.	ENEMATA.			EXCRETION.				Weight of Patient in Kilogrammes.
	Nitrogen.	Fat.	Sugar.	N. of Fæces.	N. of Urine.	Fat.	Sugar.	
I.	7.32	53.07	38	4.87	6.05	21.18	0	46.535
II.	7.32	53.07	38	3.58	4.48	15.38	0	
III.	7.32	53.07	38	5.93	6.55	24.83	0	46.215
IV.	7.32	53.07	38	6.21	6.30	27.85	0	
V.	5.36	36.20	38	6.21	6.30	27.85	0	
VI.	5.36	36.20	38	6.61	3.36	24.33	0	45.0595
Totals	40.00	284.68	228	33.41	33.04	141.42	0	Loss in weight 1.4755 kilos.

Day.	Nitrogen absorbed.	Nitrogen of Urine.	Nitrogen from Tissues.	N. Value as Proteid of Tissues.
I.	2.45	6.05	3.60	22.50
II.	3.74	4.48	0.74	4.62
III.	1.39	6.55	5.16	32.25
IV.	1.11	6.30	5.19	32.43
V.	−0.85	6.30	7.15	44.68
VI.	−1.25	3.36	4.61	28.81
Totals	6.59	33.04	26.45	165.29

Caloric value of material metabolised per diem as average over period :—

Proteid.	Calories.	Fat.	Calories.	Sugar.	Calories.	Total Calories.
6.81	27.93	23.87	221.99	38	155.8	405

Observation III. — Fairly well nourished young woman, aged 30. Relapsed gastric ulcer.

Enema: Eggs.
Dextrose.
Normal saline solution.

Enemata fairly well retained. On two occasions urine and bowel contents were mixed. The urinary nitrogen on these days was got approximately, by averaging the nitrogen of the fæces on the three previous days and deducting it from the total nitrogen of the day in question.

The patient passed through a satisfactory convalescence.

OBSERVATION III.

Day.	Enemata.			Excretion.				Weight of Patient in Kilogrammes.
	Nitrogen.	Fat.	Sugar.	N. of Fæces.	N. of Urine.	Fat.	Sugar.	
I.	8.36	41.09	68.16	6.57	2.11	20.78	0	48.9185
II.	8.36	41.09	68.16	4.86	2.29	21.55	0	
III.	8.36	41.09	68.16	6.64	3.75	26.42	0	
IV.	7.48	39.61	57.12	6.02	2.22	32.05	0	46.6485
V.	7.48	39.61	57.12	6.31	3.11	24.51	0	
VI.	7.48	39.61	57.12	6.34	3.18	19.60	0	
VII.	7.48	39.61	57.12	6.33	2.15	35.55	0	46.081
Totals	55.00	281.71	432.96	43.07	18.81	180.46	0	Loss in weight 2.8375 kilos.

Day.	Nitrogen absorbed.	Nitrogen of Urine.	Nitrogen from Tissues.	N. Value as Proteid of Tissues.
I.	1.79	2.11	0.32	2.00
II.	3.50	2.29	−1.21	−7.56
III.	1.72	3.75	2.03	12.68
IV.	1.46	2.22	0.76	4.75
V.	1.17	3.11	1.94	12.12
VI.	1.14	3.18	2.04	12.75
VII.	1.15	2.15	1.00	6.25
Totals	11.93	18.81	6.88	42.99

Caloric value of material metabolised per diem as average over period: —

Proteid.	Calories.	Fat.	Calories.	Sugar.	Calories.	Total Calories.
10.62	43.56	14.46	134.47	61.85	253.58	431

Observation IV.—Young woman, aged 25. Poorly nourished. Somewhat nervous and emotional. Signs and symptoms of chronic gastric ulcer.

Enema: 2 eggs.
Dextrose.
NaCl.

Enemata well retained, but complaint of considerable gastric pain after injection.

After rectal feeding, progress was slow, gastric pain being set up whenever food was given. After a prolonged restricted diet, digestive symptoms were markedly ameliorated.

OBSERVATION IV.

Day.	Enemata.			Excretion.				Weight of Patient in Kilogrammes.
	Nitrogen.	Fat.	Sugar.	N. of Fæces.	N. of Urine.	Fat.	Sugar.	
I.	7.48	39.61	57.12	7.46	6.72	35.72	10.10	50.394
II.	7.48	39.61	57.12	6.04	5.35	37.31	0	
III.	7.48	39.61	57.12	6.26	6.18	31.33	13.6	
IV.	7.48	39.61	57.12	8.10	6.22	35.70	5.08	
V.	7.48	39.61	57.12	7.10	6.16	41.15	16.76	
VI.	7.48	39.61	57.12	5.36	6.61	29.16	0	
VII.	7.48	39.61	57.12	7.71	6.97	28.73	0	46.762
Totals	52.36	277.27	399.84	48.03	44.21	239.10	45.54	Loss in weight 3.632 kilos.

Day.	Nitrogen absorbed.	Nitrogen of Urine.	Nitrogen from Tissues.	N. Value as Proteid of Tissues.
I.	0.02	6.72	6.70	41.87
II.	1.44	5.35	3.91	24.43
III.	1.22	6.18	4.96	31.00
IV.	−0.62	6.22	6.84	42.75
V.	0.38	6.16	5.78	36.12
VI.	2.12	6.61	4.49	28.06
VII.	−0.23	6.97	7.20	45.00
Totals	4.33	44.21	39.88	249.23

Caloric value of material metabolised per diem as average over period :—

Proteid.	Calories.	Fat.	Calories.	Sugar.	Calories.	Total Calories.
3.86	15.63	5.45	50.68	50.61	207.50	273

Observation V.—Very well nourished girl, 17 years of age. Somewhat chlorotic. Gastric ulcer.

Enema: 200 c.c. milk.
White of one egg.
Dextrose.
1 grm. NaCl.
Water to 300 c.c.
Peptonised, sterilised.

Enemata well retained. Recovery uninterrupted.

OBSERVATION V.

Day.	Enemata.			Excretion.				Weight of Patient in Kilogrammes.
	Nitrogen.	Fat.	Sugar.	N. of Fæces.	N. of Urine.	Fat.	Sugar.	
I.	4.87	9.53	91.41	2.42	4.23	8.30	16.66	44.946
II.	4.87	9.53	91.41	3.46	6.41	10.86	5.41	
III.	4.87	9.53	91.41	3.09	6.92	11.60	12.14	
IV.	4.87	9.53	91.41	3.77	8.20	9.44	6.54	
V.	4.87	9.53	91.41	4.61	8.43	18.74	3.33	
VI.	4.87	9.53	91.41	3.38	7.84	13.14	2.90	
VII.	3.65	7.14	68.56	2.44	6.10	10.09	2.31	40.860
Totals	32.87	64.32	617.02	23.17	48.13	82.17	49.29	Loss in weight 4.086 kilos.

Day.	Nitrogen absorbed.	Nitrogen of Urine.	Nitrogen from Tissues.	N. Value as Proteid of Tissues.
I.	2.45	4.23	1.78	11.12
II.	1.41	6.41	5.00	31.25
III.	1.78	6.92	5.14	32.12
IV.	1.10	8.20	7.10	44.37
V.	0.26	8.43	8.17	51.06
VI.	1.49	7.84	6.35	39.68
VII.	1.21	6.10	4.89	30.56
Totals	9.70	48.13	38.43	240.16

Caloric value of material metabolised per diem as average over period:—

Proteid.	Calories.	Fat.	Calories.	Sugar.	Calories.	Total Calories.
8.65	35.36	(−2.55	−23.71)	81.10	332.51	344

Observation VI.—Fairly well nourished young woman. Somewhat anæmic. Symptoms of gastric ulcer for over a year.

Enema : 200 c.c. milk.
Dextrose.
White of one egg.
1 grm. NaCl.
Water to 300 c.c.
Peptonised and sterilised.

Enemata very well retained. Felt very well during rectal feeding. Recovery uninterrupted.

OBSERVATION VI.

Day.	Enemata.			Excretion.				Weight of Patient in Kilogrammes.
	Nitrogen.	Fat.	Sugar.	N. of Fæces.	N. of Urine.	Fat.	Sugar.	
I.	4.90	14.35	39.08	1.71	8.29	5.83	1.00	45.4
II.	4.90	14.35	39.08	1.14	9.83	5.23	0	
III.	4.90	14.35	39.08	2.84	9.69	10.31	1.97	
IV.	4.90	14.35	39.08	2.90	9.32	11.22	2.50	42.222
V.	4.90	14.35	39.08	3.40	8.01	12.82	3.63	
VI.	4.90	14.35	39.08	3.81	7.11	16.31	2.91	
VII.	4.90	14.35	39.08	2.90	4.62	14.36	2.79	39.952
Totals	34.30	100.45	273.56	18.70	56.87	76.14	14.80	Loss in weight 5.448 kilos.

Day.	Nitrogen absorbed.	Nitrogen of Urine.	Nitrogen from Tissues.	N. Value as Proteid of Tissues.
I.	3.19	8.29	5.10	31.87
II.	3.76	9.83	6.07	37.93
III.	2.06	9.69	7.63	47.68
IV.	2.00	9.32	7.32	45.75
V.	1.50	8.01	6.51	40.68
VI.	1.09	7.11	6.02	37.62
VII.	2.00	4.62	2.62	16.37
Totals	15.60	56.87	41.27	257.90

Caloric value of material metabolised per diem as average over period :—

Proteid.	Calories.	Fat.	Calories.	Sugar.	Calories.	Total Calories.
13.87	56.88	3.47	32.27	36.96	151.53	240

The Absorption and Metabolism of Albumin.

Voit and Bauer seem to have been the first to carry out observations on the nitrogenous metabolism of rectal feeding ; working with dogs they found that the absorption of albumin was greatly aided by the addition of salt.

Eichorst repeated these experiments and obtained similar results.

Leube in 1872 published a paper on meat and pancreas enemata, by which he claimed to get an absorption equivalent to 500 calories per diem.

Ewald in 1887 contributed a paper on egg and peptone enemata which has been accepted as the basis on which most modern statements are made as to the value of rectal feeding. Exception may be taken to Ewald's methods, for phenolpthalin was used as an indicator in the nitrogenous estimations, and it is now universally admitted that phenolpthalin is useless as an indicator when dealing with ammonia. The results in this paper are expressed in the form of a graphic chart which, though at the first glance appearing very convincing, is in reality exceedingly complicated and difficult to follow. When the data are carefully analysed and the figures written down, they appear insufficient to form a metabolic profit and loss account, and the reader is unable from the data given to submit the author's claims to criticism. Judging by the results of other observers, the absorption of proteid in the cases quoted by Ewald, if it is to be accepted, was quite exceptional.

Armin Huber, working at the nutritive value of egg injections, gives observations on three patients. The patients were kept on a fixed diet throughout the observation. For three or four day periods, enemata of emulsified egg or egg and salt were given in addition to the diet. The periods during which the enemata were given alternated with periods of food by the mouth alone. The results given by Huber are very variable —so variable that one is driven to conclude that there must be considerable experimental error in many of the figures. In Observation A, Period V., with enema of egg and salt, there is a nitrogen balance of + 3.68 ; while in Period VII., with the same injections, there is a balance of + 23.05. In Observation C, a man aged 51, one finds even greater apparent discrepancies.

In Period III., when *no* enemata were given, there is a positive balance of 3.83. In Period IV., when eggs and salt were given per enema, a positive balance of only 2.38, while the patient is still losing weight. In Period V., with no enema, a negative balance of 5.92. In Period VI., a positive balance of 7.74, while the weight of the patient remained stationary. Such results are eminently unsatisfactory.

Ehrstrom obtained relatively good results with the use of milk, grape sugar, and proton—a soda-casein preparation. His patient absorbed daily 3.92 gr. of nitrogen, and was not thereby kept in nitrogenous balance; but that is not surprising, as the total nourishment given was only equal to 700 calories.

Bial claims to have got favourable results with the use of Witte's peptone; he made the observations on himself. There was first a period of starvation, followed by a one-day period during which three enemata of 250 c.c. 10 per cent. solution of peptone were taken; to one of these alcohol was added. Bial claims to have got an absorption of 50.5 per cent. of peptone, and 66 per cent. in the case when alcohol was added. Eichorst's observations on a dog can scarcely be considered reliable, as the dog was suffering from glycosuria and albuminuria.

TABLE I.

Table to show proteid and nitrogen of food and proteid and nitrogen absorbed, with caloric value of absorption as average per diem:—

	ENEMA.		ABSORPTION.[1]		
Observation.	Proteid.	Nitrogen.	Proteid.	Nitrogen.	Caloric Value.
I.	71.43	11.43	9.52	1.54	39
II.	41.62	6.66	6.87	1.098	27
III.	49.06	7.85	10.52	1.7	43
IV.	46.75	7.48	3.86	0.618	15
V.	29.71	4.69	8.62	1.38	35
VI.	30.6	4.9	13.87	2.22	56

Plantenga found very small absorption of albumin even when salt solution was added, and Markwald comes to the

[1] Caspari, in a recent physiological study on Vegetarianism (*Pflügers Archiv*, Bd. cix., 1905, S. 533), calculates that the amount of nitrogen contained in the digestive secretions equals 0.38 grammes per diem. If this observation be correct, and if it applies to cases under rectal alimentation, it would increase the nitrogen absorption by that figure. The tables have not been calculated on this basis, as we have no sufficient evidence of the digestive secretions under rectal alimentation.

same conclusion. Plantenga, in a second communication, investigated the absorption of somatose from the lower bowel of the dog. He found in his observations an absorption averaging from 10.8 to 24.1 per cent.; a very poor result.

Edsall and Miller studied two patients very fully. They worked with milk and eggs, and found that the nitrogen absorptions daily equalled, in the first case, 3.041 grm. nitrogen, or 19 grm. proteid, while in the second it equalled 3.809 grm. nitrogen, or 23.816 grm. proteid. There seems thus a consensus of opinion that albumin is but poorly absorbed even when predigested and when salt is added. This conclusion is the more remarkable when we consider how largely the white of egg is used in rectal feeding.

Our observations are given in Table I.

In Observations I. to IV. inclusive, considerable amounts of proteid were used (two eggs in each injection). In Observations V. and VI. the white of one egg was used along with milk. In all the observations the amount of proteid absorbed is remarkably small. In Observation IV., a poorly nourished, somewhat nervous subject, the amount absorbed is particularly small. In Observations V. and VI., where a smaller amount of proteid was given in the injection, the absorption was just as good as when a larger amount was given. In fact, in Observation VI., the absorption of proteid was better than in any of the preceding cases, and this notwithstanding the fact that milk was used in the enema, and milk is generally considered, except by Aldor, to be a food-stuff very poorly assimilated by the bowel in rectal feeding.

TABLE I.A.

To show absorption of nitrogen per kilo. of body weight :—

Observation.	N. absorbed.	Body Weight.	N. absorbed per Kilo.
I.	1.54 grm.	51.5	0.029 grm.
II.	1.09 „	46.5	0.0234 „
III.	1.7 „	48.9	0.035 „
IV.	0.61 „	50	0.012 „
V.	1.38 „	45	0.03 „
VI.	2.22 „	45	0.049 „
Average	1.42 „		0.0297 „

When the absorption of nitrogen is considered as per kilo. of body weight per diem, it is seen to be very small indeed. It is remarkable, when one looks into the literature of the subject, on what a small absorption of nitrogen nitrogenous balance can be kept up in individuals who have become accustomed to a nitrogen-poor diet. Thus, in six individuals on a nitrogen-poor diet observed by Hirschfeld, Kumagawa, Klemperer, Sivén, and Albu, the average nitrogen absorption per kilo. of body weight amounted to 0.116 grm. per diem. These individuals were kept in nitrogenous balance. In Sivén's own case, indeed, the intake of nitrogen was only 0.08 grm. per kilo. of body weight, and nitrogen balance was kept up for a short time at least. Table I.A shows the nitrogen absorption in our cases per kilo. of body weight; it averages 0.0297 grm. over the six cases, a figure far below even the minimum absorption, when nutrition was kept up in individuals used to a nitrogen-poor diet. Table I.B shows the nitrogen balance in our six cases of rectal feeding; in all it is seen to be markedly negative. The patients were losing nitrogen from the tissues.

TABLE I.B.

Nitrogen balance :—

Observation.	N. absorbed.	N. of Urine.	Balance.
I.	1.54 grm.	3.27 grm.	- 1.73
II.	1.098 „	5.5 „	- 4.408
III.	1.7 „	2.4 „	- 0.98
IV.	0.61 „	6.31 „	- 5.69
V.	1.38 „	6.87 „	- 5.49
VI.	2.22 „	8.12 „	- 5.89

From our observations it may be concluded that—

1. Proteid food, even when predigested and with salt added, is very poorly absorbed in rectal feeding.

2. The albumin of eggs, as generally used in rectal feeding, is a very expensive and unsatisfactory food stuff.

3. There is no relation between the amount of proteid injected and the amount absorbed. Absorption seems to

depend more on the patient's individual capacity for absorption than on the amount of proteid food given.

Absorption of Fat.

Much of our knowledge of the absorption of fat is based on the work of Munk and Rosenstein. Their observations were made on a patient with a lymph fistula through which the absorbed chyle could be collected. The patient was kept on a fat-poor diet, then given enemata of an emulsion of 15 grm. of lipanin, with 0.4 per cent. saline solution. The lymph showed a rise in fat contents of from 0.18 to 0.45; that is to say, 3.7 per cent. of the oil was absorbed. In the second observation the fatty content of the hunger lymph was estimated, a cleansing injection was then given, followed by an enema of 20 grm. of lipanin in soda solution. The lymph showed a rise in fat of from 0.06 to 0.37 per cent., and after 9 hours was still 0.23 per cent. There was absorption, therefore, of 5½ per cent. of the fat of the enema.

Kobert and Koch found that emulsified fat was slowly absorbed in small quantities, unemulsified fat was but little absorbed.

Munk and also Armschink found that fat is better absorbed the lower its melting-point.

Deucher gives observations on three patients who were kept on a fixed diet and at intervals given enemata of fat in addition. It seems to us that here, as in many observations on rectal feeding, the giving of food by the mouth is a most unsatisfactory complication of the observation. In Deucher's first observation, 6.8 per cent fat was absorbed; in the second, during the first period 12.6 per cent., during a second period 19.5 per cent. absorbed. In the third observation, when a small quantity of fat was given and a longer period allowed for absorption, 63.8 per cent. was absorbed.

Deucher concludes that 10 grm. of fat per diem are absorbed with difficulty even in favourable circumstances, and that the best results are got by the use of small quantities retained in the colon a long time, and with salt added to the injection.

TABLE II.

Table to show absorption of fats as average per diem :—

Observation.	Fat of Enema in Grm.	Fat absorbed in Grm.	Percentage of Absorption.	Caloric Value.
I.	103.37	45.85	44	426
II.	47.44	23.87	51	222
III.	40.24	14.46	35	134
IV.	39.61	5.45	12	50
V.	9.18	- 2.55	—	- 23.71
VI.	14.35	3.47	24	32

In our observations the fats were estimated by weight after extraction with ether; the resulting figure may, therefore, be more correctly called ether soluble bodies. The results obtained differ materially from those of Deucher. We find a definite relation between the amount of fat given and the amount absorbed. The maximum of absorption, 45 grm. in Observation I., was where the maximum 103 grm. were given in 24 hours. Considerable fat absorption was got whenever a large amount of fat was used in the enema. In Observation IV. a small amount was absorbed, 5.45 grm., equal to 13 per cent. as compared with Observation III., where with practically the same amount in the enema a considerably larger quantity was absorbed, but it is to be noted that the patient in Observation IV. was poorly nourished and exceedingly emotional and that albumin was equally badly absorbed. Observation V. is difficult to explain: the amount of fat recovered from the stool was greater than the amount injected by an average of 2.5 grm. per diem. The patient was a very well nourished, somewhat chlorotic young woman, and one can only conclude either that her fat absorption was practically nil and that the surplus amount recovered was accounted for by the digestive secretions, or that some unauthorised article of food was taken by the mouth. The latter explanation was indignantly denied by the patient and considered impossible by the nurses in charge, and is not borne out by the figures of the nitrogen and sugar metabolism.

In glancing at Table III. it is interesting to note that fat absorption seems to play an important rôle as a nitrogen saver:

the loss of tissue nitrogen for the six observations is very much larger in those where the fat absorption is poor. Taken as a whole, these observations show that emulsified fat is a very useful ingredient in rectal enemata, and is very much better absorbed than is generally considered.

TABLE III.

Table to show loss of nitrogen of tissues and loss of weight in relation to fat and sugar absorption as average per diem :—

Observation.	Nitrogen of Tissues.	Loss in Weight in Kilos.	Fat absorbed.	Sugar absorbed.	Caloric Value of Absorption.
I.	1.73	0.378	45.85	43.8	606
II.	4.4	0.245	23.87	38	378
III.	0.98	0.405	14.46	61.85	388
IV.	5.69	0.518	5.45	50.61	258
V.	5.49	0.583	- 2.55	81.1	308
VI.	5.89	0.778	3.47	36.96	184

Absorption of Sugar.

The absorption of sugar has been studied by Voit and Bauer, Schoenborn, Strauss, Leube, Plantenga, Deucher, Zehmisch, and others.

Deucher gave a patient during nineteen hours five enemata containing each 40 grm. sugar, and got an absorption of 77 per cent., that is to say, 154 grm. were absorbed. Plantenga, working with smaller quantities, got good results. Zehmisch, giving 152 grm. per rectum, got an absorption of 103 grm.

In these observations, conclusions were drawn from the amount of sugar or dextrine recovered from the stool; that is to say, a known quantity of sugar was given by the bowel, the sugar in the fæces estimated, and the difference taken as the measure of absorption. Exception has been taken to this method. It has been urged, that under the influence of micro-organisms, sugar is split up, and is absorbed or passed in the stool as the products of bacterial action, and thus much which

disappears from the bowel contents has provided no nutriment for the patient.

This view is supported by Reach. He shows that 60 grm. dextrine given by the mouth has a definite effect in raising the respiratory quotient, while the same amount given by the bowel did not definitely raise it. He considers that the amount of sugar absorbed by the bowel is very considerably behind the amount absorbed when given by the mouth. Dextrine, he finds, is better absorbed by the bowel than sugar, and does not irritate the bowel to the same extent.

We have thought it of interest to see how far sugar was broken up under the influence of the micro-organisms of the bowel, and especially the B. coli communis, the most important micro-organism of the intestine.

The observations were carried out on solutions of dextrose of known strength. To the dextrose peptone was added. A number of tubes containing 10 c.cm. of the solution were sterilised, and subsequently inoculated with B. coli communis or with bowel contents from a patient under rectal feeding. The tubes were then incubated, and the loss of sugar estimated every hour. As a rule it was found that the loss of sugar reached a maximum after four or five hours of incubation. A large number of observations were carried out. Six are given. From this table it will be seen that in all the loss of sugar was below 1 per cent., ranging from 0.49 per cent. to 0.77 per cent.

TABLE IV.

Observation.	Material used.	Incubation Time.	Loss in Sugar.
I.	Dextrose, .5 % peptone, bacillus coli comm.	4 hours	0.49 per cent.
II.	Do. do.	4 „	0.51 „
III.	Do. do.	4 „	0.56 „
IV.	Dextrose, 5 % peptone, and bowel contents	5 „	0.74 „
V.	Dextrose and bowel contents	4 „	0.73 „
VI.	Do. do.	5 „	0.77 „

TABLE V.

Table to show absorption of sugar as average per diem :—

Observation.	Sugar of Enema.	Sugar absorbed.	Caloric Value.
I.	47.75	43.8	179
II.	38	38	155
III.	61.85	61.85	253
IV.	57.12	50.61	207
V.	88.14	81.1	332
VI.	39.08	36.96	151

With the exception, then, of Reach's observations, which we cannot accept as conclusive, the objections to the use of sugar as not being utilised, but as being split up before absorption, are wholly theoretical. Our observations would tend to show that the amount lost by bacterial action is but small, being always below 1 per cent. In support of our view we may cite the observations of Kausch and Socin, who have demonstrated in animals that milk sugar and galactose, when given by the bowel, appear to enter the liver and are converted into glycogen.

In the clinical cases pure dextrose was used. Table V. shows the results obtained. In all the cases the absorption appeared good. In Observation III., where 61.85 grm. were given daily, all appeared to be absorbed; in Observation V. 88 grm. were given, 81 absorbed. The absorption seems to vary in the different cases, not with the amount given, but rather with the varying capacity of the individual for absorption.

Caloric value of material metabolised per diem as average over period :—

Proteid.	Calories.	Fat.	Calories.	Carbohydrate.	Calories.	Total Calories.
—	—	4.15	38.595	120.72	494.95	533

The caloric value obtained from the use of sugar ranged from 151 calories as a minimum, to 332 calories as a maximum In none of our cases was there any bowel irritation produced by the dextrose, a disadvantage which has been urged against its use.[1] In no case did alimentary glycosuria result.

[1] The absence of bowel irritation was probably due to the use of pure dextrose. Commercial dextrose may contain impurities, such as sulphuric acid, which would induce bowel irritation.

OBSERVATION VII.

Day.	Enemata.			Excretion.				Weight of Patient in Kilogrammes.
	Nitrogen.	Fat.	Carbohydrate.	N. of Fæces.	N. of Urine.	Fat.	Carbohydrate.	
I.	2.51	15.33	130.38	1.88	12.18	3.78	20.00	57.885
II.	2.51	15.33	130.38	0.87	7.64	1.26	6.90	
III.	2.51	15.33	130.38	2.46	5.91	12.94	5.46	
IV.	2.51	15.33	130.38	3.22	5.68	17.15	5.44	
V.	2.51	15.33	130.38	3.30	6.05	19.27	5.14	
VI.	2.51	15.33	130.38	3.50	4.73	12.67	15.00	58.112
Totals	15.06	91.98	782.28	15.23	42.19	67.07	57.94	Gain 0.227 kilos.

Day.	Nitrogen absorbed.	Nitrogen of Urine.	Nitrogen from Tissues.	N. Value as Proteid of Tissues.
I.	0.63	12.18	11.55	72.18
II.	1.64	7.64	6.00	37.50
III.	0.05	5.91	5.86	36.62
IV.	−0.71	5.68	6.39	39.93
V.	−0.79	6.05	6.84	42.75
VI.	−0.99	4.73	5.72	35.75
Totals	−0.17	42.19	42.36	264.73

[Case 7 is not included in our averages. The patient was admitted to hospital suffering from severe hæmorrhage from the stomach. During the first two days of the period of observation there was blood in the stool, and though the nitrogen of the fæces on these days is not high, we have omitted the case from our series. It is to be noted, however, that considerable quantities of sugar were absorbed, raising the caloric value of the rectal nutriment to 533 calories. The slight gain in weight is probably due to absorption of water following on the hæmorrhage.]

TABLE VI.

Relation between food calories used and loss in patients' weight as average per diem :—

Observation.	Food Calories.	Calories used.	Loss in Weight in Grammes.
I.	1777	645 = 35 per cent.	367
II.	939	405 = 48 „	246
III.	869	431 = 49 „	405
IV.	894	273 = 30 „	519
V.	567	344 = 60 „	584
VI.	428	240 = 56 „	892

Table VI. shows the relation between the caloric value of the food given, the caloric value of the food absorbed, and the loss in the patient's weight. The table seems to show fairly conclusively that the observation data may be considered accurate. The figures in column 1 diminish from above downwards; in Observation I. a much larger amount of food was given than in Observation VI. Column 2, showing the calories used, diminishes from above downwards, but it is to be noted that the percentage absorption is not in proportion to the amount given: thus in Observation I., while 645 C. were absorbed (equivalent to only 35 per cent. of the food given), the wastage was large. In Observation V., while only 344 C. were absorbed, the absorption equalled 60 per cent. of the food given. The loss in the patient's weight increases from above downwards in the table. When little food was absorbed, as in Observation VI., when only 240 C. were absorbed, the loss in weight is greatest, equalling 892 grammes per diem.

The important point for the clinician is, how far can rectal alimentation be relied on as a means of nourishing a patient if gastric rest is indicated as a therapeutic measure. How far can a patient's nutrition be kept up during a period of gastric rest? The standards of food requirements which have generally been accepted are those of Voit and of Atwater. These expressed simply in their protein and energy value are :—

	Protein Grm.	Energy Value in Calories.
Voit . .	85	1860
Atwater . .	100	2700

Chittenden, however, in his recent work on "Physiological Economy in Nutrition," has established a new standard of dietary requirements. He carried out a series of experiments on himself and his colleagues, as representing professional men, and on a number of typical athletes, and found that in the athlete, as well as in the less active or professional men, health and undiminished working capacity could be maintained with an intake of proteid food far below the quantity generally consumed, and that without increasing in any measure the amount of non-nitrogenous food.

Sivén in his work shows that the organism does not suffer through a diminished supply of protei, and can for a short time,

at least, exist as well on 12 to 13 grm. of pure albumin as on a hundred, without any of its own proteid suffering; and that the individual does not lose in energy by an albumin-poor food, for energy is fed at the potential cost of the nitrogen-free food. Sivén, in his own person, was able to keep up nitrogenous balance with a nitrogen intake equalling only 0.08 grm. per kilo. body weight. Albu, working with a female vegetarian, got a nitrogen balance on a diet containing a value of 1400 calories with a nitrogen intake of only 0.15 grm. per kilo.

Paton and Dunlop, from their diet studies, are inclined to adhere to the older standards notwithstanding Chittenden's results.

The question for the clinician is—given even a reduced standard of dietetic requirements—how far does rectal feeding meet these requirements? The caloric value of the food absorbed in our investigations varied from 645 calories as a maximum to 240 calories as a minimum, giving an average of 389 calories. Thus we get from rectal feeding only about a quarter of the nourishment required to maintain equilibrium, even if a reduced standard of nutritive requirements be accepted. In considering these cases it must be remembered that they are all cases where rectal feeding was well borne, the conditions were in fact favourable to food absorption. If the rectal feeding was not well borne, if diarrhœa or vomiting was at all a prominent symptom, or if the patient's nutrition was obviously suffering under the rectal feeding, other methods of treatment were adopted and the observation was not included in the series.

The caloric value obtained in our cases is much below that claimed by Leube with meat and pancreas enemata. Riegel speaks well of Leube's enema; in our hands it proved unsatisfactory. It was difficult to administer, the pancreatic value of fresh pancreas was found very variable, and intestinal putrefaction was such a marked feature after its use as to cause a pronounced toxæmia. Both the patient who received the enema, and the nurse who administered the daily cleansing enema, suffered severely.

From our series of cases we must conclude that rectal feeding, even under the most favourable circumstances, is sub-

nutrition of a most pronounced character. Given a patient in poor condition, it cannot be relied on to produce any material improvement in nutrition. This seems an important point to emphasise. The surgeon frequently wishes to have a patient suffering from œsophageal or pyloric obstruction brought into a condition of improved nutrition before operation. It cannot be too strongly emphasised that rectal feeding cannot be relied on to produce this desired result. It will at once be urged that patients may gain weight under rectal feeding. In considering this the absorption of water from the intestine must be remembered. After severe hæmorrhage or persistent vomiting, as in pyloric obstruction or gastric ulcer, the tissues are suffering markedly from a deficiency of water; on placing the patient on rectal feeding, water is absorbed and there may be a gain in weight. This is well seen in Observation VII., where rectal feeding was begun after a very severe hæmorrhage from the stomach. Though the observation shows a marked negative nitrogen balance and an absorption of 500 calories, there was a gain in weight after six days' rectal feeding.

If the physician desires to make use of rectal feeding, it seems from our observations that the best results will be got from the carbohydrates and fat. The absorption of proteid food from the bowel is so small as to make it of little value as a food stuff.

Folin has recently enunciated a theory of proteid metabolism which would place proteid on a much lower scale as a food than is at present admitted. He regards proteids, in fact, as of secondary importance, inasmuch as their nitrogen is split off and eliminated, leaving the carbon and hydrogen containing part to be oxidised, and thus to yield energy as it is yielded by the carbohydrates and fats. Folin's views have not so far met with general acceptance (Paton), but even without accepting Folin's views, we may evidently with advantage abandon much of the nitrogenous material which is at present used in rectal alimentation.

There remain, then, the carbohydrates and fats. In regard to carbohydrates, in our observations pure dextrose was used and gave most excellent results. In all cases it was well absorbed and produced no ill effects, such as bowel irritation

or alimentary glycosuria. In Observation VII., the caloric value of the food-stuff absorbed was raised to 500 calories by increasing the quantity of sugar. During the whole period of observation the patient was comfortable, and did not suffer from hunger. The disadvantage of pure dextrose is that it is somewhat expensive.

The disadvantage of fat in rectal feeding seems to be the wide difference of absorptive power of different individuals, as is very well seen in our observations. When well absorbed it should prove most valuable, but the absorption cannot be foreseen in any given case. It is undoubtedly best given in the natural state, as in the yolk of egg. If prepared fat is used, it should be fine emulsion of a fat of low melting-point. Pure olive oil may be used, a small quantity being saponified and used to emulsify the whole.

For practical purposes a good nutrient enema consists of—

The yolks of two eggs.
30 grm. pure dextrose.
.5 grm. common salt.
Pancreatised milk to 300 c.cm.

The approximate caloric value of such an enema equals 300 calories. Given every six hours the total nourishment injected would equal 1200 calories. Absorption under favourable circumstances might equal 500 calories, but most probably would be much less.

In rectal feeding the method of administration and the size of the enema are both important points. Nutrient enemata should never be administered with a syringe. To place a syringe in the hands of a nurse is to court failure. Substances rapidly injected into the bowel will as promptly be returned. The enema should be very slowly syphoned in by means of a soft rubber catheter and a small-sized filter funnel. Retention of the nutrient material is not then a matter of difficulty. If there be bowel irritability, a small dose of morphia may be added to the injection. The daily cleansing of the bowel with a saline injection is, of course, an absolute necessity.

The amount of the nutrient injection commonly used in

this school is from 4 to 6 oz. (112 to 168 c.c.). This is possibly too small an amount. If the enema be given slowly, 8 to 10 oz. (250 to 300 c.c.) can be retained, and the patient absorbs at least sufficient water and does not suffer from thirst, a prominent difficulty when small injections are used. Larger injections do not require frequent repetition, a distinct advantage where gastric rest is desired, for it must be remembered that the injection of nutrient material into the lower bowel excites gastric secretion, and may thus prevent the healing of a gastric ulcer, and account for the gastric pain so frequently complained of in gastric cases under rectal feeding. This gastric secretion, though long recognised clinically, has been clearly demonstrated recently by Umber in a patient on whom gastrotomy had been performed. After a rectal injection there was a free gastric secretion, with a total acidity of 30, free hydrochloric acid equalling 20.

It is the popular belief that substances injected into the lower bowel are absorbed below the ileo-cæcal valve, but this does not seem always to be the case. Insoluble particles injected into the rectum may, under favourable conditions, reach the stomach. Grützner has shown that if starch emulsion be injected into the rectum along with normal saline solution, the starch granules can be washed out of the stomach four to six hours afterwards. The passage of the nutrient material beyond the ileo-cæcal valve may account for the good results got in some cases of rectal alimentation, and is an argument in favour of increasing the bulk of nutrient enemata when the patient can tolerate the larger injection. That the ileo-cæcal valve will admit of the passage of fluid in every case cannot, however, be expected; in fact, we have frequently failed to find insoluble particles, such as charcoal, in the stomach washings in cases where charcoal was added to the nutrient enema.

The conclusion to which this study of the metabolism leads, seems to be that rectal alimentation has a much more limited field of usefulness in clinical medicine than is at present accepted. In the treatment of acute gastric diseases where it is so commonly employed, it interferes with complete gastric rest by inducing gastric secretion, and does not sufficiently nourish the patient.

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THE USE OF STOVAÏNE AS A SPINAL AND LOCAL ANÆSTHETIC[1]

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MR PRESIDENT AND GENTLEMEN,—The use of a General Anæsthetic in surgical procedures, no matter what general anæsthetic is used, is always a source of possible danger to the patient; and, now that the dangers due to, or in consequence of, the actual operative procedure have, in the majority of cases, been reduced to a minimum, the anæsthetic may be regarded as the most dangerous factor in many operations.

Not only have we to consider the immediate dangers of the anæsthetic, but also the remote dangers, which, until recent years, have been insufficiently recognised.

At intervals, various local anæsthetics have been introduced, and great advances have been made in the methods of producing local anæsthesia, both regionally and by infiltration; but these methods have their limitations.

Bier first attempted the production of anæsthesia by spinal injection.

Cocaine was used, but, as the after results were often of a most unpleasant, not to say dangerous nature, the method for a time fell into disuse.

On the introduction of adrenalin, further attempts at spinal anæsthesia were made, the adrenalin being added to cocaine or some other local anæsthetic.

This method has received still further attention since the introduction of Stovaïne.

In February 1904, Fourneau (1), a French chemist, first publicly brought before the profession a series of chemical substances, among them the hydrochlorate of amyleine, which he named Stovaïne.

For some time previous to this date its action had been tested on man. Reclus (2) tried it as a local anæsthetic in October 1903, and shortly afterwards Chaput (3) first used it as a spinal anæsthetic.

Stovaïne is derived from tertiary amylic alcohol; it crystallises in little brilliant flakes, resembling cocaine.

[1] Read before the Edinburgh Medico-Chirurgical Society, January 17, 1906.

According to most authorities it is a vaso-dilator, but Pouchet (4) denies this; it is certainly not a vaso-constrictor, and has an antithermic action, points to be remembered when we compare its toxicity with cocaine. Stovaïne has also evident antiseptic properties. It is extremely soluble in water. Aqueous solutions can be boiled without interference with its action.

Solutions slowly decompose when heated to 120° C. in an autoclave, but can withstand a temperature of 115° C. for 20 minutes.

A point worth noting in regard to the chemical formula is that Stovaïne has no carbon ring; in eucaine there is one, and in cocaine, two. This proves that its presence is not, as has hitherto been supposed, an essential in substances having anæsthetic properties.

Stovaïne, if injected into animals in sufficient strength to cause death, gives rise to paresis of the hind legs, tonic spasms, followed by clonic spasms of a violent nature, coma, and death, in the order mentioned.

The most evident post-mortem changes are marked congestion in all the organs and dilation of the peripheral and deep vessels.

Regarding the therapeutic applications of Stovaïne, one is instinctively led to compare it with cocaine, the actions of which are already so well known.

Stovaïne slows the pulse and induces contraction of the pupil; it does not cause pallor but often flushing; there is no dyspnœa, oppression, uneasiness, or excitement. There is no tendency to syncope.

Its action, in some instances, is just as efficient as cocaine; in others, nearly so. It is most certainly much less toxic, and therefore can be given in larger doses if required.

With regard to the after results, there is usually a slight rise of temperature, which may last for some days (although, as previously mentioned, a toxic dose causes a rapid fall of the temperature). There is little tendency to sickness or vomiting; headache and spinal neuralgia are rarely present; if present, often slight. The general condition is good, and the patient can enjoy an ordinary meal. In rectal cases, retention of urine is the exception.

Regarding the early literature, Fourneau's original paper on certain amino-alcohols has already been mentioned.

Billon (5), in March 1904, gave a detailed account of the physiological properties of Stovaïne, the greater portion of which has been fully detailed by Luke (6) in the *Scot. Med. and Surg. Journ.*

Reclus (2), July 1904, gives the results of his work for the previous nine months with Stovaïne as a local anæsthetic.

He used Stovaïne in doses twice the strength that he was accustomed to use cocaine, without any bad results.

Chaput (3), in May and November 1904, gave the results of his observations, having used Stovaïne both as a local and as a spinal anæsthetic. He considers Stovaïne slightly inferior in its anæsthetic action to cocaine. He maintains that many laparotomies can be performed under spinal anæsthesia with Stovaïne, if the patient is not emotional. For spinal anæsthesia he uses doses of 2 to 8 centigrammes. In 100 cases, 45 operations were performed on the legs, 26 on the perineum, 29 on the abdomen.

Among the abdominal operations were hydatid cysts of the liver, hernias, abdominal hysterectomies, appendectomies, pyosalpinx, and ovariotomy.

He states that all operations on the legs and perineum can be performed with spinal anæsthesia, but is of opinion that it is not good for extensive laparotomies. It can be used for appendicitis during the quiescent stage and for inguinal hernias. It is also of use in fractures, both simple and compound, and for dislocations of the lower limbs. Although the muscular tonicity remains, the reflex contractions, which are the true cause of the difficulties of reduction, are got rid of. Among other conditions, he reduced a dislocation of the hip in a young and muscular man. With doses ranging from 2 to 8 centigrammes he obtained 3 total anæsthesias including the head, 4 as far as, and including, the arms, 12 to the middle of the sternum, 13 to the xyphi-sternum, 9 to the epigastrium, 26 to the umbilicus, and 20 to the iliac spine.

He allows that the value of this method may be disputed with regard to abdominal surgery, but maintains that good results can always be obtained anywhere below the umbilicus. The height of the anæsthesia varies with the amount of the

drug injected, and in all his failures only a small dose had been given. The sensitiveness of the subject must also be taken into account.

Chaput has injected 4 centigrammes for laparotomies below the umbilicus, and if, during the next 10 or 15 minutes, the anæsthesia appeared insufficient, a further dose was given. This had the desired effect. Young adults need rather larger doses. In one of his cases the pulse fell as low as 40 beats per minute, in 4 of his cases nausea was observed, in 4 vomiting, and in 10 profuse perspiration, in 7 pallor of the face, and in 5 mental distress. In his experience, the after results of Stovaïne are much less severe than those of cocaine. In his 100 cases, headache was observed 30 times on day of operation, 6 times on next day, 5 times on the third day, and once on the fourth. It was always relieved by the application of ice. Neuralgia was more frequently met with. On the day of the operation 51 times, on the next day 29 times, on the third day 3 times, on the fourth twice, and on the fifth once.

Vomiting was noted 4 times on the first day, 6 times on the second, and once on the third. Nausea 7 times on the first day, 4 times on the second, and twice on the third.

In the majority of cases the temperature rose to about 100° F., but fell in a few hours. After cocaine the temperature is often high the following day. He states that Stovaïne has such great advantages over cocaine that it should always be used in preference. He uses Tannon's modification of Tuffier's needle.

He describes the case of a patient 66 years of age, in which 7 centigrammes of Stovaïne, taken from a "defective old stock," were injected. The pulse stopped, and all the reflexes were lost. Caffeine, ether, artificial respiration, etc., were resorted to. The pulse returned. The same afternoon the patient was able to speak, but suffered from a low delirium which continued for some days, at the end of which time he completely recovered.

He does not care to employ Stovaïne in patients over 65 years of age, but if used in old people it should be given in small doses. He describes another case, a woman 52 years of age suffering from arthritis of the hip and great pain in the legs. Only 1 centigramme was injected. No anæsthesia

was obtained, but two hours later bilious vomiting occurred. The temperature rose to 104° and the patient became somnolent. The next day the temperature remained high, the somnolence increased, and she died at one o'clock. He considers this case to be of an entirely different nature to the previous one, which he looks upon as a true case of intoxication.

I have quoted Chaput's paper somewhat fully, as it records the first results obtained with Stovaïne as a spinal anæsthetic.

Lapersonne, about the same time, first used it as an anæsthetic in ocular surgery. It has also been used in dentistry, midwifery, and for neuralgia.

Sonnenburg (7) has given us a detailed account of his work with Stovaïne as a spinal anæsthetic, the results being similar to those of Chaput. He regards the use of Stovaïne for spinal anæsthesia as an important advance in the whole question of narcosis, and maintains that not only operations on the extremities, but also abdominal operations as high as the costal arch, can be performed painlessly.

In 56 cases he had 11 failures, and in 1 case death resulted. This he reports fully. The patient suffered at the time from septic peritonitis. Ten days after the operation the temperature and pulse rose. Two days later the patient developed twitchings of the hands and arms and stiffness of the neck. On the thirteenth day after the operation the patient died. At the post-mortem examination localised abscesses were found in the abdomen. The inner surface of the dura was covered with pus; the posterior cranial fossa was also affected.

He considers the lowest age limit to be about 14 years, and the upper age limit to be about 60. He goes somewhat fully into the various theories regarding the innervation of the peritoneal cavity.

In conclusion he gives a summary of his cases.

Tuffier (8), in June of 1904, describes his old technique, substituting Stovaïne for cocaine. He considers its anæsthetic properties both as regards intensity and duration as good as cocaine. Further, that if no fault be made in technique, the anæsthesia is certain.

He is of opinion that no bad results follow from spinal

anæsthesia, having anæsthetised over 2000 cases by this method, and having watched many of his cases for over four years. With Stovaïne he had then operated on 89 cases, including operations on the uterus and the appendix. He regards the introduction of Stovaïne as an important advance in spinal anæsthesia.

Silbermark (9), writing on spinal analgesia, does not consider old age as a contra-indication. Bier (10) describes a record of 102 cases. He, too, considers this method a good one for old and weak patients. He considers it contra-indicated in laparotomies, but useful in rectal cases. In 7 of his cases vomiting occurred, in 1 slight collapse, in 10 unpleasant after effects occurred. Columbani (11) maintains that debility and old age are not contra-indications for spinal anæsthesia, but that a marked degree of arterio-sclerosis is. It is contra-indicated in children and in persons suffering from nervous diseases and syphilis. Reclus (12) is not very enthusiastic regarding spinal anæsthesia, and considers that many operations performed by this method might be done with local anæsthesia. Filliatre (13), in May 1905, read a paper on spinal anæsthesia induced by cocaine, and in it mentions that Stovaïne was used in some cases, but was unsatisfactory both at the time and afterwards. Time does not permit of any mention of other foreign literature on the subject, and I can find no original articles on Stovaïne as a spinal anæsthetic in this country.

In October 1904 I heard of this new anæsthetic, and being interested in local anæsthesia I obtained some. Since then, on various occasions I have used it combined with hemesine as a local anæsthetic when occasion offered.

In the spring of 1905, when in Paris, I saw M. Tuffier operate on several cases in which Stovaïne was used as a spinal anæsthetic, and at that time obtained the solution and instruments as used by him.

My spinal cases are few in number, chiefly owing to the fact that with a new drug I have been particular to obtain the permission and full approval both of the patients and their doctors.

As previously mentioned, the usual amount of Stovaïne used for spinal anæsthesia ranges from 2 to 8 or 10 centi-

grammes. So far, I have found that I require a relatively larger dose than that usually recommended to get the anæsthesia to pass to the required height. I have used Tuffier's solution, 10 per cent. of Stovaïne in sodium chloride. This is supplied by Billion in ampuls, one of which contains half a c.c., representing 5 centigrammes of Stovaïne.

This solution is now supplied in ampuls of a more convenient shape than those which I originally obtained.

Bier has recently suggested a formula which differs from Tuffier's solution in that it contains adrenalin. He maintains that its specific gravity is nearer that of the cerebro-spinal fluid than Tuffier's, and consequently there is less chance of headache and spinal neuralgia following its use. It is also said to maintain the anæsthesia for a longer period.

I have used Tuffier's needle and an all glass syringe, which can be boiled. If boiled with other instruments, all traces of soda must be removed both from the syringe and from the needle before using.

The patient's lumbar region is prepared the night previous to the operation in a similar fashion to the part to be operated on, and is then covered with a dry sterilised dressing. This is removed in the theatre, and the skin again thoroughly purified. I regret that lumbar puncture was not practised in the medical wards of the hospital when I was a resident as it now is. If it had been, I feel sure that the results of my cases would not have been so varied as they are. In other words, the failures were due rather to the faulty technique of the operator than to any fault of the method. Sonnenburg and Columbani both mention faulty technique as the probable cause of failures. When one is about to inject the drug the needle is first fixed to the syringe, an assistant breaks the ampul, the needle is inserted and the required amount of fluid drawn into the syringe. Remove the needle and lay the syringe carefully down on a sterilised towel. The patient bends as far forward as possible. Tuffier's line is found by ascertaining the position of the highest points of the iliac crest, and drawing an imaginary line between them. This crosses the spine of the fourth lumbar vertebra. The needle is inserted about a centimetre from the middle line at a slightly lower level, inwards and forwards for a distance varying from

5 to 7 centimetres, depending on the muscularity of the subject.

With the patient in the above position, the instruction which is sometimes given to pass the needle upwards is, I think, misleading.

In order to facilitate the introduction of the needle, I have had a detachable metal handle made, which I have found useful.

One knows at once when the needle passes through the tough ligamentum sub-flavum.

On passing the needle a little further on, the cerebro-spinal fluid should escape when the handle is removed. The syringe is then fitted to the needle, and the piston withdrawn. Some cerebro-spinal fluid is in this way mixed with the solution in the syringe. The combined contents are then slowly injected, the needle rapidly removed, and the puncture sealed. The needle may strike bone, in which case it must be partially withdrawn and reintroduced at a different angle. It may be necessary to withdraw the needle and make a fresh puncture at a different level. Should a vein be punctured, a fresh needle should be introduced at another point. Although the needle enters the canal, no cerebro-spinal fluid may escape, in which case the needle is probably blocked and a stilette should be passed along it. Puncturing the skin in this region is not at all painful. If the injection be successful the patient will, in a few minutes, begin to feel a condition of "pins and needles" in the legs, or he may complain that his lower limbs are going to sleep. Those premonitory signs are shortly followed by an inability to lift the limb off the table, and in about seven minutes sensation to pain is lost, although sensation to touch remains.

The anæsthesia commences in the perineal region, then affects the toes and feet, and passes gradually up the limb. The height and duration of anæsthesia depend as a rule on the amount of the drug injected.

The anæsthesia disappears in the reverse order to that in which it set in, sensibility returning last in the region of the perineum.

I have attempted spinal anæsthesia with Stovaïne in 14 cases. In 2 I failed to reach the spinal canal; in a third the

needle entered the spinal canal, but, owing to blocking of the needle, I was unable to make the injection. With regard to this case, it is of interest to know that some days later she developed severe spinal neuralgia and occipital headache. This cannot possibly be put down to the drug, as none was injected.

Turton (14), writing on lumbar puncture for diagnostic purposes, states that "troublesome after effects are rare, though headache, nausea, vomiting, and convulsions have been produced." In 3 other cases chloroform had also to be given, in every case due to an insufficient dose. In one, a man of 23, suffering from inguinal hernia, 4 centigrammes were injected. Anæsthesia developed only as far as the thigh. A second injection was attempted, but the syringe broke, and chloroform was given. Little chloroform was required.

Another was that of a child 5 years of age, in which the dose was 1½ centigrammes. In this case transplantation of tendons was carried out, and the greater part of the operation done under spinal anæsthesia. Before the operation was completed the anæsthesia began to pass off, but a few whiffs of chloroform sufficed to finish the operation. The third was a case of sigmoidostomy, in which the anæsthesia only ascended as far as the thigh. He also only required a little $CHCl_3$. In another case, suffering from tubercular glands in the groin which had suppurated, the anæsthesia was not complete.

In the remaining cases the anæsthesia was absolutely satisfactory. One girl, operated on for severe traumatic flat foot, complained, but could not tell what was being done. As soon as the hammer and chisel were used she stopped complaining and began to take an interest in the proceedings. Perhaps it is needless to state that the field of operation is screened from the patient's sight. The other cases included patients up to the age of 61. Two suffered from hæmorrhoids, one from severe varicose veins of both legs, one from double inguinal hernia, both sides being operated on at the same time, and one from tuberculous foci. This patient was operated on twice; on the second occasion the knee-joint was opened into and the patella sawn through. In the hæmorrhoid cases the stretching of the sphincter gave rise to no inconvenience whatever. No bad results occurred during the operations, but the pulse of the child already mentioned became rather feeble as the anæsthesia

passed off. No bad after results occurred. One patient suffered from slight spinal neuralgia, and one from headache. Both yielded to treatment. I regret that my cases are so few in number and so varied in results, but I am perfectly satisfied that with a little more experience, both in technique and in the amount of drug required, failures will be exceptional. I hope at a future date to submit a further series of cases.

I have avoided operating in this manner on cases in which sepsis was present. The death described by Sonnenburg appears to me to be one in which organisms, previously circulating in the blood, had settled down in the spinal cord; possibly this is accounted for by the local traumatism set up by the puncture.

It may be argued that one is putting the patient to an unnecessary risk by injecting drugs into the spinal canal, but one also runs risks when giving general anæsthetics. For those patients who dread the latter more than the operation, spinal anæsthesia is particularly useful.

Lumbar puncture is now a routine method carried out for diagnostic purposes in medical cases, and accidents are rarely met with.

At one time surgeons looked upon the peritoneal cavity as sacred ground. Now all this is changed. May it not be that lumbar injections will in the future be more freely used?

It is too soon yet to compare the risks with those of a general anæsthetic, but it must be admitted, I think, that this method may be preferable in many cases.

I have purposely detailed all the drawbacks met with, but I am convinced that for operations on the perineum and lower limbs this method has many advantages, both during and after operation, over a general anæsthetic.

In regard to Stovaïne as a local anæsthetic, I have not time to go into the literature. I have used it both with hemisine and by itself, and have obtained better results with the mixture. In one case in which I used Stovaïne alone it apparently was an absolute failure. I have not found it superior to eucaine β and hemisine, to which I have referred on a previous occasion (15). Among the cases I have operated upon by this method are the following:—

Multiple wens of scalp.

Large single wen of scalp.

Tracheotomy for cut throat and stitching up divided larynx.

Amputation of great toe at metatarso-phalangeal joint.

Excision of fatty tumour.

Excision of recurrent nodule of carcinoma.

Double vasectomy.

Removal of a portion of needle from a foot.

Removal of portions of a rib infected with tubercle, and scraping the abscess connected therewith.

Excision of a large mass of thrombosed veins.

Opening up a whitlow and removing a necrosed phalanx.

Sinclair (15) of New York, writes a paper on gangrene of the skin following the use of Stovaïne, and cites cases in which trouble had occurred. His conclusions are as follows :—

1. That it has not the lasting anæsthetic properties possessed by cocaine.

2. That it does produce intoxication when injected subcutaneously.

3. That it is a most dangerous and unreliable drug, producing chronic œdema and gangrene of the parts into which it is injected when used in the strength of a 2 per cent. solution.

4. That it interferes with and considerably delays the healing process. Luke (6) states that its one disadvantage is that it cannot be used along with adrenalin solution, for if it is, the skin at the point of injection becomes gangrenous.

I cannot agree with the above statements, and in the cases in which I have used a combination of the drugs mentioned I have not had a single case of gangrene of the skin.

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THE MORISON LECTURES FOR 1906[1]

The Pathology of General Paralysis of the Insane

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ABSTRACT

STATISTICS seem to indicate that general paralysis of the insane has been increasing during recent years. The etiology and pathogenesis of the disease, notwithstanding many positive and dogmatic assertions that have been made regarding them, have hitherto remained a profound mystery. In the recent literature of the subject there can be recognised a growing dissatisfaction with the syphilitic hypothesis. The pathological alterations known to occur in the nervous system consist chiefly in acute and chronic degenerative changes in the cortical nerve cells, degeneration of the medullated fibres of the brain, especially in the first layer of the cortex, hypertrophy and proliferation of the neuroglia in the cortex and elsewhere, formation of granulations of the ependyma, pro-

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liferative changes in the walls of the cerebral vessels, generally accompanied by the development of plasma cells, thickening of the pia-arachnoid in consequence of chronic proliferative changes in its tissues, the appearance of large numbers of lymphocytes in the cerebro-spinal fluid, and early tabetic lesions in the spinal cord. During the last six years a series of researches have been carried out in the laboratory of the Scottish Asylums with the object of elucidating the essential pathology of the disease. Dr L. C. Bruce has also made independent clinical investigations of a similar nature. In 1901, Dr Bruce recorded the results of continuous observations made upon the temperature and leucocytosis in individual cases. He showed that febrile attacks generally occur every two or three weeks, and that these attacks are accompanied by leucocytosis, and that in the third stage leucocytosis may occur from time to time without rise of temperature. He concluded from his observations that general paralysis is a disease directly due to poisoning by the toxines of bacteria whose point of attack is through the gastric and intestinal mucous membranes. In a paper published at the same time, the writer maintained similar views on the ground of the results of an examination of the pathological changes in the alimentary tract in a series of cases. Further evidence of chronic toxæmia was found by Dr A. C. Ainslie in the constant occurrence of widespread and often well-marked chronic endarteritis of the extra-cerebral vessels, even in cases in which senile changes could be excluded. In 1902, Dr G. Douglas M'Rae, Dr Jeffrey, and the writer commenced a bacteriological investigation. It was found that a diphtheroid bacillus was specially prominent in the gastro-intestinal and respiratory tracts in cases of general paralysis, and that a similar organism could frequently be isolated from the brain. The hypothesis was advanced that general paralysis is the result of a chronic toxic infection from the respiratory and alimentary tracts, permitted by general and local impairment of the defences against bacteria, and dependent upon the excessive development of various bacterial forms, but especially upon the abundant growth of a Klebs-Löffler bacillus of modified virulence, which gives the disease its special paralytic character. Dr M'Rae and the writer have since been continuing these

bacteriological investigations, and every step forward has resulted in the elucidation of some fact that has made this diphtheroid hypothesis more probable. Histological investigations have yielded much confirmatory evidence. Dr Shennan and the writer have made a short series of experimental investigations with diphtheroid bacilli isolated from cases of general paralysis. The organisms have proved non-virulent to guinea-pigs. Rats fed upon bread mixed with unsterilised broth cultures developed nervous symptoms, and died in about ten weeks. These animals presented evidence of the occurrence of many of the morbid processes that can be recognised in the nervous system of the general paralytic, but they survived too short a time to make it possible for the complete histological picture to be developed. In three of the animals there was a widespread invasion of the tissues by the bacillus in a filamentous form, which has also been found invading the tissues in several cases of general paralysis. Dr L. C. Bruce has made a similar observation upon a goat which he injected with cultures derived from the same source as those used in the experiments upon the rats. The goat became paretic and died in a condition resembling a "congestive attack." Its brain shows changes resembling those in an early case of general paralysis. In May of last year, Dr M'Rae and the writer recorded that they had found that diphtheroid bacilli are constantly present, often in very great numbers, in the genital tract in both male and female paralytics. Further, in seven consecutive cases of general paralysis, combined with tabes, the urine has been found to be loaded with diphtheroid bacilli. It was also ascertained that bacilli, having little affinity for staining reagents, but having a distinct resemblance to diphtheroid bacilli, could be observed in the blood during congestive attacks, in the centrifuge deposit from the cerebro-spinal fluid removed by lumbar puncture and in the urine. These and other similar observations raised the question whether diphtheroid bacilli are not from time to time gaining access to the blood, and being rapidly destroyed by phagocytic and lysogenic actions. In order to gain light upon this question, Dr M'Rae and the writer have investigated experimentally the action of the living blood upon pure cultures of diphtheroid bacilli isolated from cases of general

paralysis. It has been ascertained that the bacilli are taken up by leucocytes with great rapidity, and that they may be completely dissolved in the interior of the leucocytes within two or three hours. An endeavour has been made to estimate exactly the power of the leucocytes of different individuals to dissolve these bacilli, and it has been found that this power is distinctly greater on the part of the leucocytes of the general paralytic than on that of the leucocytes of controls. The appearances of the dissolving bacilli in the experimental films are identical with those presented by the imperfectly staining micro-organisms that can be seen in various situations in the general paralytic. The results of this experimental study suggested that failure of previous attempts to obtain cultures from the blood and cerebro-spinal fluid is dependent upon the fact that most of the bacilli are dead, and that the few living ones that are occasionally present are quickly killed by the continued action of the phagocytic cells. An endeavour was therefore made to obtain growths by leaving the tubes in the cold for twenty-four hours, and then incubating them. This plan has proved successful with the blood from four cases, and with the centrifuge deposit from the cerebro-spinal fluid in two. In all of these cases pure growths of a diphtheroid bacillus were obtained. The growths are at first generally extremely feeble. A feeble culture may be invigorated by sub-culturing upon blood films.

There are many weighty arguments against the view that general paralysis and tabes dorsalis are essentially syphilitic in their origin. They have been ably stated by Bianchi and some others. The part played by syphilis is no doubt an important one, but it is only that of weakening the general and local defences against bacteria. There is the clearest evidence that the general paralytic suffers from an active bacterial toxæmia. The evidence that a diphtheroid bacillus—either an attenuated form of the Klebs-Löffler bacillus, or more probably an altogether distinct micro-organism—is the specific etiological factor in general paralysis and tabes dorsalis is briefly as follows. A bacillus of this nature is, according to the results of our investigations, present in large numbers either in the alimentary or respiratory tract, or in both, and in the genito-urinary tract in all cases of advancing general paralysis.

This bacillus has a thread form, which has been found invading the walls of the respiratory or alimentary tract in five cases of general paralysis. It can be shown that this bacillus invades the pulmonary tissues in cases of general paralysis, and that it is commonly the only micro-organism present in large numbers in the catarrhal pneumonic foci that occur in most of such cases dying in congestive attacks. A growth of a diphtheroid bacillus has now been obtained in cultures made from the brain post-mortem in 10 cases of general paralysis out of 24 in which cultures were made from this organ. Diphtheroid bacilli exhibiting metachromatic granules in Neisser preparations have been detected in the fresh blood in one case, and in sections of the brain in two cases. It has been ascertained by experimental methods that these diphtheroid bacilli in contact with the living blood are rapidly taken up by the polymorpho-nuclear leucocytes, and that they may be completely digested in the course of two or three hours. Bodies exactly corresponding in appearance to these dissolving bacilli can be detected in the blood and cerebro-spinal fluid of the living general paralytic, especially during a congestive attack. Whilst the fact that most of the bacilli present are in process of disintegration satisfactorily explains the long succession of negative results of endeavours to obtain cultures from the blood and cerebro-spinal fluid, we have by the use of special methods succeeded in obtaining pure growths of a diphtheroid bacillus from the fresh blood in four cases of general paralysis, and from the cerebro-spinal fluid withdrawn by lumbar puncture in two cases. In sections of the brain prepared by special methods, disintegrating diphtheroid bacilli can be recognised in the walls of the vessels and in the pia-arachnoid in many cases of general paralysis. The centrifuge deposit from the urine of the general paralytic, especially during a congestive seizure, commonly contains abundant diphtheroid bacilli that have been more or less affected by lysogenic action. In seven consecutive cases of general paralysis combined with tabes we have found the centrifuge deposit from the urine to contain not only these altered diphtheroid bacilli, but also living ones, showing distinct metachromatic granules. In such cases a culture of the bacillus can be obtained from the urine. Experimental infection of

three rats and a goat with diphtheroid bacilli isolated from a case of general paralysis has resulted in the production of symptoms and tissue changes resembling those of general paralysis. Lastly, there is evidence that the active polymorphonuclear leucocytes of the general paralytic have as a rule a greater power of dissolving these diphtheroid bacilli than that possessed by the normal leucocyte. It would therefore appear that the general paralytic has acquired against these diphtheroid bacilli a certain degree of specific immunity by means of which he is enabled to maintain the struggle against these bacilli, notwithstanding an otherwise defective local and general power of resistance. The bacillus appears to be conveyed from individual to individual as a rule by contagion. There is ample warrant for the conclusion that if a mucosa is healthy, the organism can neither multiply at the surface to any important extent nor invade the tissues. A preliminary weakening of the local and general defences is evidently necessary. There are numerous inimical forces that can produce this condition of impaired local and general defence, but there are three that seem to have special importance. They are the pathogenic agent of syphilis, alcohol, and nitrogenous foods used in excess. There is evidence that a mere saprophytic infection may continue for a long time without leading to any important toxic effects. It is probably only when the bacillus invades the tissues that the paralytic toxæmia becomes of any great intensity. Invasion appears to take place most commonly from the bronchi, although it can also be shown to have taken place from the alimentary tract in many cases. At the seat of such invasion, what is virtually a life and death struggle between the bacilli and the leucocytes takes place. It is a conflict in which the leucocytes after a long succession of victories are ultimately defeated, for their power of renewal is limited, whilst that of the bacilli is virtually unlimited. Local invasion manifests itself clinically in a congestive attack. Large numbers of the bacilli reach the circulation either by way of the lymphatics or through the capillary walls. They can be seen in the blood stream in the neighbourhood of infective foci. Most of the bacilli that reach the blood are quickly seized by leucocytes and digested, but many escape from the circulation in one or other of two ways, namely,

through the capillaries of the kidney into the urine and through the walls of the cerebral vessels into the adventitial lymph channels. The further disintegration of the bacilli that takes place in these lymph channels gives rise to a local toxic action. There is thus a general toxæmia due to the disintegration of the bacilli at the seat of the invasion and in the blood, and an added local cerebral toxic action dependent upon the disintegration of the bacilli that have passed through the endothelium of the cerebral vessels. In some instances the successful repulsion of an invasion is followed by a prolonged period in which the bacillus is kept at bay. Clinically this corresponds to a remission. More commonly there is a continuous comparatively slight absorption of toxines from the infective focus, and a succession of more or less severe invasions, which time after time are repelled. In the end, however, the defensive forces are overcome. There is then a fatal congestive attack. With regard to the pathogenesis of tabes dorsalis, it is to be noted that Orr and Rows have recently. shown that tabetic lesions of the cord can be produced by the absorption of toxines from peripheral septic foci. The toxines pass up the perineural sheaths without injuring the nerve fibres, and affect the fibres of the posterior root as they enter the cord at the spot where they lose their neurilemma sheath. In order to account for the similar lesions that occur in tabes, it is necessary to find some peripheral toxic focus. The evidence at present points to this focus being in the bladder. In ten consecutive cases of tabes (three being cases from which material was supplied by Dr Orr, of Prestwich Asylum), abundant living diphtheroid bacilli have been found in the urine, and, therefore, these patients were suffering from a diphtheroid cystitis. In these cases the bacilli were present in too great numbers to have come merely from the urethra, which in other cases very frequently contains some diphtheroid bacilli. If further observations confirm the testimony of these ten cases, we shall be bound to conclude that in tabes there is in the urinary tract an infective focus comparable to that which occurs in the respiratory or alimentary tract in general paralysis. The bacilli are invading, and therefore produce toxic effects far greater than those that result from the simple passage of the disintegrating bacilli through the urinary tract.

There is evidence that the general paralytic defends himself, and often with prolonged success, by manufacturing specific bacteriolytic anti-bodies. It seems, therefore, worth while to produce such anti-bodies in suitable lower animals, and to use them as therapeutic agents. This method of treatment is at least going to be given a trial at the Royal Edinburgh Asylum.

Births and Deaths registered in Eight of the Principal Towns of Scotland during January 1906

DURING the month of January 1906 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth, the births of 4285 living children, of whom 2206 were male, and 2079 female. These births are equivalent to an annual birth-rate of 28.2 per 1000 of the estimated population of these towns, a rate which is 2.4 more than that for the previous month, and 0.3 more than that for the corresponding month of last year. The birth-rate for the month was highest in Greenock, 34.1, and lowest in Edinburgh, 21.7. In Glasgow it was 30.8; in Leith, 29.4; in Paisley, 28.1; in Perth, 28; in Dundee, 27.4; and in Aberdeen, 26.7. The number of births registered in these towns was 457 more than in the previous month, and 142 more than in the corresponding month of last year.

Of the total births, 291, or 6.8 per cent., were illegitimate. This illegitimate rate was highest in Aberdeen, 10.9, and lowest in Paisley, 3.8. In Perth it was 9.8; in Dundee, 9.4; in Glasgow, 6.6; in Greenock, 5.4; in Edinburgh, 5.1; and in Leith, 4.4.

Deaths registered in these towns during the month numbered 2894, 1411 being of male persons, and 1483 of females. These deaths are 273 more than in December, but 196 fewer than in January 1905. For this number of deaths the equivalent annual death-rate is 19.1, a rate 1.5 higher than that for December, but 1.7 less than that for January 1905. The death-rate for the month was highest in Dundee, 25.6, and lowest in Paisley, 14.7. In Glasgow it was 19.4; in Greenock, 19.3; in Perth, 18.8; in Edinburgh, 18.5; in Leith, 17.4; and in Aberdeen, 15.3. In Aberdeen, Paisley, and Greenock, the death-rate was lower than what it was in December; in the remaining towns it was higher than in that month.

Of the 2894 deaths registered during the month, 969, or 33.5 per cent., were of children of less than five years old; while 775,

or 26.8 per cent., were of persons of over sixty. The former are 19 more than in the previous month, but 105 fewer than in the corresponding month of last year; the latter are 117 more than in the previous month, but 57 fewer than in the corresponding month of last year.

Deaths of children of less than one year old numbered 591, a number equivalent to an infantile mortality of 141 per 1000 births. This infantile mortality rate is 12 higher than that for December, but 11 less than that for last January. The infantile mortality rate for the month was highest in Dundee, 246, and lowest in Perth, 71. In Leith it was 155; in Glasgow, 140; in Greenock, 132; in Aberdeen, 125; in Edinburgh, 110; and in Paisley, 100. In Glasgow, Dundee, and Leith, this rate was higher than what it was in December; while in Edinburgh, Aberdeen, Paisley, Greenock, and Perth, it was less than in that month.

Deaths from the principal epidemic diseases numbered 251; this is equivalent to an annual death-rate from these causes of 1.7 per 1000. These deaths are 15 fewer than in December and 54 fewer than in last January. The death-rate from these causes is 0.1 less than that for December, and 0.4 less than that for last January. The death-rate from these causes for the month was highest in Dundee, 4.1, and lowest in Aberdeen, 0.3. In Greenock it was 2.8; in Glasgow, 1.9; in Perth, 1.0; in Paisley, 0.9; in Leith, 0.9; and in Edinburgh, 0.7.

There were no deaths registered during the month as due to smallpox. Deaths from measles numbered 128; these are 25 fewer than in December, but 76 more than in January of last year. Of these deaths, 90 were registered in Glasgow, and 21 in Dundee; the latter was the principal cause of the high death-rate from infectious disease for the month in that town. Deaths from scarlet fever numbered 9, which is 6 fewer than in the previous month. Deaths from hooping-cough numbered 28; these are 5 fewer than in December, and 148 fewer than in January of last year. Deaths from diphtheria numbered 41; these are 8 more than in December, and 18 more than in January of last year; of them, 18 were registered in Glasgow, and 7 each in Edinburgh and Dundee. There were no deaths from typhus fever. Deaths from enteric fever numbered 7, which is 2 fewer than in the previous month. Deaths from diarrhœas numbered 38, which is 17 more than in December, and 19 more than in January of last year. Deaths from influenza numbered 14, which is 2 fewer than in December, and 23 fewer than in January of last year.

Deaths from puerperal septic conditions numbered 8; from

malignant disease, 161, of which 80 were ascribed to carcinoma, 12 to sarcoma, and 69 to cancer not otherwise defined. Deaths from heart disease numbered 287; from apoplexies, 137; from premature birth debility, 82; and from alcoholism, 22.

Deaths from pneumonia numbered 294, and constituted 10.2 per cent. of the total deaths, while those from bronchitis numbered 250, and constituted 8.6 per cent. of the total. The former are 18 more than in December, but 122 fewer than in January of last year; the latter are 9 more than in December, but 76 fewer than in January of last year.

Deaths from tuberculous diseases numbered 312, and constituted 10.8 per cent. of the total. These deaths are 9 more than in December, but 20 fewer than in January of last year. Of these deaths, 212 were ascribed to phthisis.

To violent causes 125 deaths were ascribed during the month; of them, 11 were suicidal, 4 being by cutting, 5 by hanging, and 1 each by gunshot and drowning.

Of persons dying during the month, 3 males and 9 females were aged 90 years or more, the oldest of them being a retired domestic servant aged 98.

Supplement to the Forty-eighth Detailed Annual Report of the Registrar-General of Births, Deaths, and Marriages in Scotland.

THIS supplement deals with the vital statistics for the decade 1891-1900.

Population.—Comparing the mean population of this with that of the previous decade, there was a total increase of 368,265; that the population of the urban districts had increased by 415,651, but that the population of the rural districts had diminished by 47,386.

Expectation of Life.—The male child at birth had during this decade an expectation of life of 44.68 years; when one year old, 51.08; when two years old, 52.90; when three years old, 53.09; when four years old, 52.92; when five years old, 52.29; when ten years old, 48.53; when fifteen years old, 44.26; at the age of twenty, 40.36 years; when twenty-five years old, 36.68 years; when thirty-five, then 29.22; when forty-five, 22.16 years; when aged fifty-five, 15.79 years; when sixty-five, then 10.53 years; seventy-five allows an expectation of 6.37 years; at eighty-five, then 3.59; and at ninety-five, 2.07 years might be hoped for.

Comparing generally the expectation of male life with that of previous decades, there was an increased expectation of

life at all ages under twenty-five and above seventy-five, but that the expectation of life between these ages has not increased, but, in fact, appears to be somewhat diminished.

The expectation of male life is greater in England than it is in Scotland at all ages from one to twenty-five, but less at birth and slightly less at all ages over thirty-five.

The expectation of life of female infants is at birth 47.44 years, and reaches its maximum at the age of three years (54.68). The other changes are very similar to those which occur amongst males. The expectation of female life is at all ages better than that of male life.

Births.—During the decade these were equal to an annual birth-rate of 30.13 per 1000 of the mean population. This was 2.13 less than that of the previous decade and 4.6 less than that of the birth-rate during 1871-80 and 4.77 less than that of 1861-1870.

Marriages.—The equivalent annual marriage-rate was 7.03 per 1000, or 0.35 more than the corresponding rate for the previous decade.

Deaths.—The death-rate for the period averaged 18.40 per 1000, or 0.76 less than that of the preceding decade. In 1861-70 this rate was 22.05; in 1871-80 it was 21.61; in 1881-90 it was 19.16. In other words, the death-rate is undergoing a steady and progressive diminution. Comparing the death-rate of this with those of the preceding decades, it is seen that the rates under forty-five are diminishing, while those of ages over forty-five are either increasing or remaining stationary. The former observation is of interest in explaining the increasing expectation of life at ages under thirty-five; the latter is of interest in perhaps being a corroboration of the increased mortality from cancer.

The *Infantile Mortality* during the decade was 128 per 1000 births. This was higher than in any preceding decade since the founding of the office. In the principal town districts the figure rose to 147 per 1000 births; while in the mainland rural it had sunk to 95, and in the insular rural to 75.7 per 1000. The infantile mortality of the country is an increasing quantity; it may be partly due to a greater proportion of the population living in the principal town districts where that mortality is highest, but it is partly due to a real increase of the number of children dying under one year old.

Causes of Death.

Smallpox.—The mean annual death-rate from this disease during the decade was 0.7 per 100,000. We may compare this with 33 per 100,000 from 1855-60, with 17 from 1861-70, with 19 from 1871-80, and with 0.3 from 1881-90.

Measles caused an average death-rate of 47 per 100,000 during the decade under examination. On an average, this rate has undergone very little change since registration was commenced,

Scarlet Fever gave a mean annual death-rate of 19 per 100,000.

Previous to 1860 it averaged 92.
From 1861-70 „ „ 91.
From 1871-80 „ „ 78.
From 1881-90 „ „ 29.

Diphtheria and Croup caused a mean annual death-rate of 29 per 100,000. During the last four decades the death-rate from these diseases has undergone a marked diminution.

Hooping-cough caused a death-rate of 51 per 100,000, and this was a lower figure than occurred in any of the preceding decades.

Typhus Fever caused only a death-rate of 1 per 100,000, and may be contrasted with 15 per 100,000 during 1871-80.

Enteric Fever gave a mean death-rate of 18 per 100,000, as compared with 39 during 1871-80 or 23 during 1881-90.

Diarrhœal Diseases.—The average death-rate from these during the decennium was 83 per 100,000, and this figure shows no marked reduction over preceding decades.

Malignant Diseases caused a death-rate of 73 per 100,000.

Previous to 1860 the death-rate from these diseases averaged 31.

From 1861-70 it was 40; from 1871-80 it was 48.

From 1881-90 it rose to 58; and from 1891-1900 it was 73.

Dr Dunlop states that—"These figures would appear to indicate that the death-rate from malignant disease is an increasing quantity . . . but there are several reasons why these figures are not dependable, and, consequently it would not be fair to infer from them that this death-rate is an increasing quantity, and far less fair to argue from them by how much the death-rate from this cause is increasing. The sources of fallacy are at least two—faulty classification in all periods, and improved diagnosis in the later periods."

(We dissent very strongly from this argument; faulty classification is as common now as it was when registration was first begun, and therefore this error is common to the entire period; nor do we believe for a moment that diagnosis during the decade under examination was so much more perfect than that exercised by practitioners during the period 1881-90 as to account for the increase of 15 per 100,000 during this interval.)

"But there is one fact which supports the view that the death-rate from this cause is an increasing one, and that is, that the death-rates of the age periods in which malignant disease is most prevalent are not like the death-rates of other age periods, less than what they were in the earlier decades, but are higher than what they formerly were."

Tuberculous Diseases accounted for an average death-rate of 237 per 100,000.

Previous to 1860 this figure averaged			336.
From 1861-70	„	„	362.
From 1871-80	„	„	347.
From 1881-90	„	„	275.

The death-rate from this group (which includes phthisis) has undergone a steady decrease, and this notwithstanding the more accurate diagnosis of the present day.

Phthisis caused a mean annual death-rate of 169 per 100,000.

Previous to 1860 this rate was			238.
From 1861-70	„	„	256.
From 1871-80	„	„	239.
From 1881-90	„	„	200.

Pneumonia gave a mean annual death-rate of 128 per 100,000.

Previous to 1860 this death-rate averaged				70.
From 1861-70	„	„	„	68.
From 1871-80	„	„	„	88.
From 1881-90	„	„	„	108.

In other words, the death-rate from pneumonia has steadily increased since 1861.

Bronchitis caused a death-rate of 164 per 100,000; the death-rate from this disease has diminished since 1881, whilst that of pneumonia has increased, and this suggests that the term pneumonia has been more frequently used since that date, and the term bronchitis less frequently so, and that the two rates, when considered separately, are not absolutely dependable.

Violent deaths accounted for an equivalent annual death-rate of 70 per 100,000. The total number amounted to 29,852, and of these 2544 were cases of suicide. Suicides by poisoning numbered 251. Of these, 108 were caused by opium, 45 by carbolic acid, 15 by prussic acid, and 14 by oxalic acid.

Very copious and interesting tables are given as to occupation mortality, but they do not allow of easy summarising.

The Forty-ninth Detailed Annual Report of the Registrar-General of Births, Deaths, and Marriages in Scotland. (Abstracts of 1903).

THE following is a summary of some of the most interesting points gathered from the exhaustive report to the Registrar-General for the year 1903 by Dr J. Crawford Dunlop :—

The *estimated population* of Scotland at the middle of 1903 was 4,579,223 (2,229,414 males, 2,349,809 females). The estimated increase of the population over the preceding year was 47,924, though the excess of births over deaths amounted to 57,523. It is suggested that the difference between these figures was due to the effects of emigration and immigration.

BIRTHS.—The number of births registered reached the highest figure yet attained in Scotland, viz. 133,528, or 4178 in excess of the average number during the last ten years. On the other hand the birth-rate was the smallest which has yet been recorded in Scotland, being only 29.159 per 1000. Contrary to what might have been expected, the birth-rate in the Principal Town Districts was 30.57. In the Mainland Rural Districts this figure fell to 25.50, and in the Insular Rural Districts to 21.63 per 1000. The relatively small number of young adults in the Rural Districts accounts for the low birth-rate there.

Fertility.—Comparing the number of births to the estimated number of women of child-bearing age, the highest rate was found in the Small Town Districts, viz. 125.7 per 1000 of such women; in the Large Town Districts it was 123.8; in the Principal Town Districts, 118.1; in the Mainland Rural, 117.3; and in the Insular Rural Districts, 99.9 per 1000 of child-bearing women.

Birth-rate.—The County of Linlithgow had the highest birth-rate, 35.45, and Bute the lowest, 18.39. As regards towns, Coatbridge heads the list with a birth-rate of 38.82; Hamilton and Motherwell follow closely after, but the figure drops to 24.71 in Edinburgh as contrasted with 31.93 in Glasgow, and Perth closes the list with a birth-rate of 24.39.

Female and Male Births—The relation of female to male births remains very uniform, being in the proportion of 100 to 104.

Illegitimate Births.—Of the total births, 8295, or 6.21 per cent., were illegitimate. This is the smallest proportion of such births yet recorded in Scotland. The ratio of illegitimate to legitimate births has undergone a steady diminution. Previous to 1873 the illegitimate births formed 9 per cent. of the total

births; from 1873 to 1888 more than 8 per cent,; from 1889 to 1897 more than 7 per cent.; since 1898 less than 7 per cent.

In the Mainland Rural Districts the illegitimate rate during 1903 amounted to 8.46, while in the Large Town Districts it fell to 4.69. The North-Eastern and the Southern Divisions of the Counties had the highest rates, 11.06 and 10.86 respectively; while the West Midland and the South-Western had the lowest rates, viz. 4.41 and 5.03 respectively. As regards Counties, Elgin had the highest illegitimate rate, 12.67; Wigtown, 12.39; Banff, 11.86; Aberdeen, 11.12; whilst the lowest rates are found in Sutherland, 3.64; Dumbarton, 3.63; and Shetland, 1.68. As regards Towns, Dundee had the highest illegitimate birth-rate, 8.74; Aberdeen, 8.37; Edinburgh, 7.63; Perth, 6.72; Glasgow, 6.19; and the lowest rate was reached by Motherwell with 2.46.

Twin Births.—The number of mothers who bore twins was 1604, or 1 birth in every 82.2 was a twin birth. These births were relatively more frequent in the Insular Rural Districts.

Seasonal Relation.—June was the month in which most births occurred, whilst in November fewest births were recorded.

The birth-rate in Scotland was 1.225 more than that of the United Kingdom, or 0.749 more than that of England and 6.087 more than that of Ireland.

MARRIAGES.—During 1903 the number of marriages registered was 32,351, or 1818 more than the average during the last ten years. The marriage-rate was 7.065 per 1000 of the estimated population. In the Principal Town Districts this rate was 8.50; in the Large Town Districts, 7.25; Small Town Districts, 6.32; Mainland Rural Districts, 5.02; Insular Rural Districts, 3.21.

The highest marriage-rate was found in Edinburgh with 9.28; Glasgow, 9.16; Aberdeen, 9.07; while in Motherwell it fell to 6.22.

The marriages of women under 25 years of age and of men under 30 were more numerous than in the preceding year.

Age of Women.—As regards the age of the women at marriage, 10.58 per cent. of the total marriages were in women below the age of 20; 43.02 per cent. were of ages from 20 to 25 years; 27.49 per cent. of ages from 25 to 30; 10.16 per cent. between 30 and 35 years; 6.81 per cent. between 35 and 45 years; and 1.94 per cent. above ages of 45 years. The mean age of marriage of both sexes has shown a steady rise during recent years.

State of Education.—Only 1.74 per cent. of the men who were married signed by "the mark," whilst in women the figure

was 2.30. These were the smallest numbers yet noted in Scotland.

DEATHS.—The deaths registered during 1903 amounted to 76,002 (38,136 males, 37,866 females). The *death-rate* per 1000 of the estimated population was 16.60, and is the lowest which has yet been recorded. In Glasgow the rate was 19.15; Greenock, 18.93; Dundee, 18.10; Paisley, 17.29; Aberdeen, 17.05; Edinburgh, 16.86; Perth, 16.68; Leith, 16.17; Kirkcaldy, 13.19.

Infantile Mortality.—As regards the deaths of infants under one year, the male death-rate very considerably exceeded the female death-rate (149.37 as contrasted with 117.46 per 1000 respectively). The death-rate—

Between	1-2	years for males was	44.36	and females	40.27	per 1000.
„	2-3	„ „	16.59	„	16.48	„
„	3-4	„ „	9.57	„	9.75	„
„	4-5	„ „	6.88	„	7.78	„

The highest death-rate per 1000 for children under the age of 5 years was recorded in Glasgow, 62.7.

The infantile mortality per 1000 births was 117.5, or 4.1 more than in the preceding year.

Nineteen centenarians died during 1903, 8 being men and 11 women; one widow reached the extreme age of 105.

The death-rate in Scotland was 0.84 more than that of the United Kingdom, 1.18 more than that of England, but 0.93 less than that of Ireland.

Causes of Death.—The following list gives the mortality per 100,000 of the population:—

Tuberculous Diseases	214	Diarrhœal Diseases	64
Pneumonia	143	Hooping-cough	43
Bronchitis	119	Measles	25
Apoplexy, Cerebral Hæmorrhage, or Hemiplegia	90	Influenza	21
Malignant Diseases	84	Diphtheria	14
Violent Causes (Accident, Homicide, or Suicide)	69	Enteric Fever	12

On the whole the Report gives us some satisfaction as showing what Preventive Medicine has already done in the way of diminishing the incidence of certain diseases; while it ought also to stimulate further effort in the same direction.

Meetings of Societies

Edinburgh Medico-Chirurgical Society

THE fifth ordinary meeting was held on February 7th, 1906—Dr J. O. Affleck, President, in the chair.

Mr Cotterill showed a fibro-sarcoma of the eighth nerve removed from the cerebello-pontine angle, and specimens of enlarged prostate removed by supra-pubic prostatectomy.

Dr Norman Walker, for Dr Allan Jamieson, showed a case of extra-genital chancre situated on the chin. Dr Norman Walker showed a boy, aged 5, suffering from pigmented warty growths on the face and ear. The case was either one of melanotic sarcoma or possibly of unilateral xeroderma pigmentosum and in either case the prognosis was grave, although the boy appeared in excellent health.

Dr F. D. Boyd read a paper on rectal feeding, which appears on page 193.

Dr Noël Paton referred to the very painstaking character of the work, and considered that the most striking point demonstrated was the extremely small amount of nitrogen which could be absorbed by the bowel; but as the paper showed that an amount of nourishment equivalent to 500 calories could be supplied by suitable methods, he thought rectal feeding, leaving aside the question of rest to the stomach, must be of importance in treatment.

Dr Russell considered that rectal feeding was often of great benefit, and remarked on the offensive effects and auto-intoxication which often followed the use of pancreatised food.

Drs Church, James Ritchie, Gulland, and the President referred to the comfort to the patient and the relief of thirst which followed rectal alimentation, and agreed that although the amount of energy to be derived from it was small, it might be sufficient to tide a patient through a crisis.

Dr Boyd, in replying, stated that he had made his observations with albumen, because most other observers had employed it, and therefore the results could be more readily compared, and with dextrose, because it was a simple sugar. In all cases of acute gastric inflammations and hæmorrhage he would employ only normal saline solution enemata to relieve thirst, and these would not interfere with rest to the stomach.

Mr C. W. Cathcart read a paper on Bier's method of treating acute inflammation by passive congestion.

It will appear in the next issue of the *Journal*.

Mr Berry remarked that acute inflammations and pain in

the eye could be relieved by the use of an irritant, dionine, and this treatment was useless unless œdema was produced. Relief could also be obtained by sub-conjunctival injections of saline solution.

Mr Alexis Thomson regretted that his results were not so uniformly satisfactory as Mr Cathcart's. The method was a useful one and worthy of further trial, but was not applicable to all cases.

Mr Stiles, while admitting the judicious character of Mr Cathcart's observations, also thought he had been a little too optimistic regarding the scope of usefulness of passive congestion and urged the necessity of careful selection of the cases in which the method would be applicable.

Mr Carmichael and Mr Struthers referred to cases they had seen treated by Bier, and Mr Struthers remarked on the great utility of the treatment in cases of suppuration of tendon sheaths.

Glasgow Medico-Chirurgical Society

THE eighth ordinary meeting took place on January 26 in the splendid new Out-patient Department of the Western Infirmary, under the presidency of Dr Lindsay Steven. There was a large attendance, and a great many cases, specimens, and pieces of apparatus, etc., were shown, being distributed over the various out-patient medical and surgical theatres. After inspection of these, the members adjourned to the operating-theatre of the dispensary, where a further number of cases were exhibited.

1. Professor Gemmell showed (*a*) A case of pseudo-hypertrophic paralysis in an adult. The patient was 23, and first noticed some weakness and uneasiness in his legs and back four years earlier. There was no definite cause nor any family history. Two years ago he was in the Edinburgh Royal Infirmary, where he improved greatly, and was able to resume work as a labourer. He has, however, again relapsed. The calf-muscles, infra-spinati, and triceps are greatly enlarged, the erectores spinæ and glutei wasted. He has difficulty in straightening the trunk, and his gait is waddling. No sensory phenomena. (*b*) Another case shown was that of a lad of 15, with Friedreich's ataxia. There was no family history of this disease; the boy had received a blow on the head shortly before the illness began. There was staggering gait, gross choreiform movements of head and shoulders, some nystagmus, slurring speech, and some claw-like grasping.

2. Professor Robert Muir showed specimens of four cases of

cirrhosis of the liver with primary cancer, of which three had come under his observation this year. It was a sufficiently uncommon condition to be of some interest, and generally the cirrhosis preceded the cancer. In the cirrhotic liver, while some parts contracted and atrophied under the increasing fibrous tissue, groups of liver-cells hypertrophied in compensation, and it looked as if the hypertrophy might exceed normal limits and develop a malignant character.

3. Dr Crawford Renton showed: (*a*) A typical case of coxa vara after operation, a wedge having been taken out of each femur just below the trochanter, and the limbs fixed apart on the hinged splints devised by Mr Stiles. When the bone had healed, the splints were gradually approximated till the legs lay parallel. The result was very good. (*b*) A case of gastro-enterostomy in a boy of 10 who, after typhoid fever, had developed a gastric ulcer that led at length to stricture of the pylorus. A successful result was attained. (*c*) Three patients on whom excision of the elbow-joint had been done, with a very free joint; and (*d*) a case of cholecyst-colostomy where a large calculus had been removed from the common bile duct, the gall-bladder being joined afterwards to the colon.

4. Dr George Beatson showed: (*a*) A case of a young woman of 29 suffering from bilateral anchylosis of the hip-joint, and spastic condition of the big muscles. It was four years since the illness commenced, and it presented the features of a coxa vara, but the X-rays showed that the trochanter was normal, and under an anæsthetic it was found that the joints were anchylosed. (*b*) Dr Beatson also showed a case of cicatricial keloid, and a distended vermiform appendix showing a peculiar cystic diverticulum.

5. Dr Walker Downie showed (in the Class Room of the Throat and Nose Department): (*a*) two patients upon whom he performed œsophagotomy for the removal of an impacted denture; (*b*) several cases of empyema of the antrum of Highmore, demonstrating the application of transillumination as a means of diagnosis; (*c*) two unusual cases of bilateral abductor laryngeal paralysis; (*d*) a case of crico-thyrotomy by which an epithelioma of the left vocal cord was removed in 1892; (*e*) a case in which a large syphilitic palatine perforation has been closed (colour sketch of lesion before operation was also shown); (*f*) a case where there was partial destruction of the nasal bones, exposure of both frontal sinuses, and exfoliation of nearly the whole (both tables) of the frontal bone; (*g*) a case of extensive destruction of the nose and of the hard and soft palate, in which the sphenoidal sinuses are exposed (Dr W. W. Christie showed Dr Geminder's instruments for opening the

sphenoidal sinus); (*h*) an instrument by which the interior of the larynx may be demonstrated to several onlookers at one time; (*i*) a large number of photographs illustrating the results of the subcutaneous injection of hard paraffin for the removal of some deformities of the nose (some cases were shown, and amongst them one, operated upon in London, in which the injected paraffin wandered into the eyelids and over the forehead).

6. Dr James Carslaw showed a case of congenital heart disease; there was no murmur, but the heart was dilated and the face cyanosed.

7. Drs Cowan and J. C. M'Clure showed a case of congenital heart disease, and illustrated the condition by means of a series of specimens from the Pathological Museum of the Infirmary. Dr Cowan also showed a case of syringo-myelia, and Dr M'Clure a case of rheumatoid arthritis in a child, associated with a purulent ear discharge.

8. Dr Edington showed a series of skiagrams, stereograms, and specimens illustrative of surgical conditions.

9. Dr J. S. M'Kendrick showed: (*a*) a temperature chart of a case of pneumonia followed by typhoid fever, *with unmistakable relapse*; (*b*) Hill and Barnard's new sphygmometer—with description of its method of application.

10. Dr Alex M'Lennan showed: (*a*) two cases of fracture of the carpal scaphoid (with radiographs); (*b*) a case of erasion of the radio-ulnar joint for chronic rheumatism; (*c*) a case of Colles' fracture operated on to remove deformity; (*d*) a case of external dislocation of the patella.

11. Dr J. H. Teacher gave a microscopical demonstration on "protozoal parasites" (malarial parasite, trypanosomes, spirochætes).

12. Dr Logan Taylor gave a microscopical demonstration illustrative of *certain diseases of the mamma.*"

13. Dr Arch. Young showed: (*a*) photographs illustrating a series of cases of skin-grafting by a modification of the Wolfe-Krause (whole thickness of the skin) method; (*b*) photographs and cast of a case of posterior tarsal resection of the foot (Mikulicz-Wladimiroff).

THE ninth ordinary meeting was held on Friday, February 2—the President, Dr Lindsay Steven, in the chair. There was a good attendance.

1. The President reported a case of round-celled sarcoma of the frontal lobes, associated with mental symptoms. He said he had already published reports of four cases of cerebral tumour, viz. one of glio-sarcoma (two growths); one of multiple

tubercular masses; one of a hæmorrhagic cyst, operated on with much success; and one of columnar-celled adenoma. This new case was that of a man of 49, who was admitted to the Royal Infirmary on September 22, 1905, and died on January 2, 1906. He came in for severe headache, vomiting, and vertigo, but he had also mental symptoms, which indeed were those first noticed in the case. In August last he became altered in disposition, facile and careless, and later still the headaches began. He was temperate; syphilis had not occurred. He had no paralysis and no anæsthesia. The pupils were equal and reacted; there was no ptosis or squint, but there was a double optic neuritis. The knee-jerks were diminished. The gait was stiff, and vertigo often came on, while the headaches were largely occipital. On October 22 he began to take epileptiform fits, with loss of consciousness; he had nine such fits altogether. For the last fortnight of life he lay unconscious and much emaciated. During all his stay he was facile, and could not concentrate attention at all.

Post-mortem a tumour as large as a tangerine orange was found in the right frontal lobe, reaching across to the left side. It was a round-celled sarcoma.

The case was discussed by Drs Maylard, Oswald, Rutherford, Arch. Young, Sime, and Pollock, and Dr Lindsay Steven replied.

2. Dr J. W. Findlay reported a case of typhoidal cholecystitis, in which the usual symptoms of typhoid were absent, and in which the bacillus typhosus was isolated from the contents of the bowel and gall-bladder. The patient, a lady of 51, complained of weakness, loss of appetite, and "biliousness." She had a temperature of 101° or so, and below the liver was a large rounded swelling, presumably the gall-bladder. There was neither jaundice nor colic. The diagnosis of cholecystitis was made with a reservation in favour of malignant disease. The blood, on being examined, gave a very positive Widal reaction, yet there was no history of any recent enteric. Dr R. M. Buchanan suggested that this might be a case of typhoidal cholecystitis, and on August 11 discovered the bacillus typhosus in the fæces. On August 15, Dr Rutherford opened the gall-bladder and evacuated about 8 ounces of purulent fluid from which the typhoid bacillus was separated in pure culture. The gall-bladder was drained, but a fortnight later many bacilli typhosi persisted. Dr Buchanan recommended it should be washed out first by sodic bicarbonate solution, next by 1-20 carbolic, and thereafter by 1-40. This was done, but the patient gradually sank and died.

Dr R. M. Buchanan gave a short account of his work in this

case, and demonstrated the organism on many of the usual media, and also the plates of M'Conkey's bile-salt agar used for separation.

Glasgow Obstetrical and Gynæcological Society

THE fourth meeting was held on Wednesday, January 24—the President, Dr J. K. Kelly, in the chair.

The following fresh specimens were shown :—

Dr Jardine :

(1) Ruptured uterus, laceration through lower uterine segment.

(2) Cancer of uterus, involving posterior lip of cervix.

Dr Stark :

(1) Calculus removed from neighbourhood of urethra, but not connected with it.

(2) Pyosalpinx.

Dr Primrose :

Anencephalus fœtus ; mother's uterus was myomatous.

Dr Duff :

Placenta from a case of placenta prævia.

President :

Sarcoma of uterus with placenta, from a case of Cæsarean section.

Dr Jardine read a paper on "Four cases of obstructed labour ; two from cancer of cervix, one from hypertrophy and prolapse of cervix, and one from complete occlusion of os uteri."

CASE I. Patient had observed the hæmorrhage from cervix when at third month of pregnancy ; no previous history of malignant disease. When admitted to the Maternity Hospital, patient was in labour, hæmorrhage having been severe but ceased ; os admitted two fingers ; child in transverse position ; anterior lip one hard mass of cancer, growth very extensive, and the condition inoperable. Os was dilated, version, and delivery ; child lived three days. Cervix and vagina were plugged, and patient did well for the time in hospital. Her subsequent history not ascertained.

CASE II. vi-para, full term, admitted in labour ; slight bleeding during pregnancy ; posterior lip of cervix cancerous ; os was dilated manually and delivery performed. Hysterectomy was performed some days later and patient made a good recovery.

CASE III. iii-para, seven months pregnant, brought in during labour. Had prolapse after first confinement, and had worn a pessary for some time. The condition became worse during pregnancy ; cervix protruding from vulva ; cervical canal about 3 inches in length ; head presenting. Cervix was pushed up, but

progress was slow. Manual dilatation of canal and forceps were applied, but craniotomy was found to be necessary. Uterus and vagina were plugged, and patient did well till she left the hospital.

CASE IV. i-para, in labour at full term, pelvis flattened, head above brim and freely movable. No os felt, but slight depression. A crucial incision was made and cervix dilated, head presenting by posterior parietal bone; version was performed and delivery; child did not breathe. Tears in cervix stitched. Patient made a good recovery; she had suffered from prolapse for some years and had worn a pessary.

Dr Parry, Dr Lindsay, and the President discussed the paper.

Dr Jardine replied.

Dr Alexander Allan read a paper on "Hæmorrhagica neonatorum," with a record of two cases.

After a brief description of the theories concerning this rare condition, Dr Allan described the cases which had come under his care.

CASE I. Child of a healthy primipara, labour slow but uneventful. The child was plump and healthy, weighing 8¼ lb. Two days later it was restless and passed blood by rectum, dark in colour and free from clots, no vomiting of blood. Pulse increased in frequency and temperature high, no rash seen. Some hours later, patches of ecchymosis were seen in umbilical region and over upper part of tibiæ; face pinched, eyes sunken. Fresh patches of ecchymosis seen later, temperature low, child died. No signs of infection at umbilicus, no history of venereal disease in parents, no record of hæmophilia or rheumatism.

CASE II. Child of iv-para, labour occurring one week later than first case mentioned, labour easy and child healthy.

Three days later child passed blood from bowel, vomited blood twice; gums soft; restless and fretful and apparently suffering from abdominal pain. Irregular purpuric spots on buttocks, lower limbs, and on chest. Pulse rapid, temperature high. Child died in convulsive seizure. No history of syphilis; other children healthy; no sepsis.

Post-mortem examination refused in both cases.

Dr Allan described the symptoms of this condition and laid stress upon the absence of history in many recorded cases. The main cause being in the fragile condition of the blood-vessels, the changes in the circulation, and the alterations in the blood of the new-born. The condition is considered of an infectious character. Treatment is general, drugs being of little use. Warmth and feeding of most importance.

The President, Dr Jardine, Dr Craig, and Dr Watson discussed the paper.

Dr Allan replied.

Dr Balfour Marshall read notes of "a case of fæcal mass in cæcum diagnosed as cancer of small intestine."

Patient, æt. 46, suffered from small swelling in abdomen, pain and sense of fulness in epigastrium, never free from colicky pain in abdomen, with constipation. On examination a hard lump felt in right lower quadrant of abdomen, size of a hen's egg, movable in all directions, not tender on pressure, easily felt on bi-manual examination. Patient was dieted and bowels attended to. Some months later she was seen in consultation with Mr Parry and was operated on by him. At operation a median incision was made and cæcum was found to contain a large fæcal concretion of size of an egg, no thickening or narrowing of colon felt. On examination of bowel, several bodies felt in a loop of ilium lying in pelvis; this loop was incised and several plum stones found, wound closed. The fæcal mass was easily broken up by fingers and removed through an incision in bowel. A stricture was found in interior of cæcum: this was incised and was found to be simple in character. Patient made a good recovery.

The President and Mr Parry discussed the paper.

Glasgow Pathological and Clinical Society

THE fifth ordinary meeting was held on February 12—the President, Professor Muir, in the chair. There was a good attendance.

1. Dr R. M. Buchanan read notes of a case of kala-azar, and gave a lantern demonstration. A short account of Leishman's and Donovan's early work on the parasite associated with their names was first given, and the discovery of the same body in kala-azar by Bentley, and in Delhi sore by Wright, was noted. Dr Buchanan also gave an account of Rogers' work in cultivating the parasite, and said that much evidence went to prove it to be a stage in the life of a trypanosoma. The patient whose case he reported to-night was a man who had lived nineteen years on the borders of Assam, enjoying good health till 1904, when he had to come home. He died in Glasgow, and the limited autopsy allowed revealed a large spleen and liver, portions of which were removed. From these organs preparations were made which showed very large numbers of the Leishman-Donovan body. Dr Buchanan showed excellent slides on the screen illustrative of this disease, and the case was discussed by the President and Drs Wells and Douglas. Dr Buchanan replied.

2. Dr J. K. Kelly and Dr Workman described a case of malignant tumour of hæmorrhagic character arising in the uterus and causing secondary growths in nearly all the organs of the body. The patient was a woman of 25, a ii-para, who had been delivered eight weeks before admission to hospital. She was bleeding steadily, and was very weak and somnolent. The uterus was sub-involuted and several nodules could be felt in the vaginal wall. Death quickly supervened, and at the autopsy a nodule was found in the uterus of the nature of a chorio-epithelioma, and secondary deposits existed in brain, heart, lungs, and indeed almost every organ of the body. Dr Kelly described the Langhan's layer and syncytium of the chorion, and pointed out what destructive powers these cells had, and how readily they could cause bleeding by erosion when transplanted.

3. Dr Jas. H. Nicol and Dr Teacher described a case of teratoma of the tongue. The child was five days old when Dr Nicol saw it, and was dying from starvation, being unable to suck. He operated at the age of seven days, and removed a large mass attached to the tongue by a pedicle largely non-vascular. Dr Teacher considered this an acardiac twin, and had found in the mass various body-tissues such as muscle, nerve, blood-vessel, cartilage, and glands, as well as certain spaces, probably attempts at heart and alimentary canal.

Editorial Notes and News

The City of Edinburgh Charity Organisation Society.

THE Edinburgh Philanthropic Red Book gives particulars of over 200 different societies, institutions, and funds existing in the city and neighbourhood. That through these agencies an enormous amount of good work is effected is beyond all question. But there is a growing belief that the present system, or rather want of system, in the administration of charity is responsible for evils of various kinds. It is quite certain that many charities are taken advantage of by persons who have no claim whatever to charitable relief; that there is frequent overlapping in the work of different agencies; and that, in spite of all that is done, there is much misery in our midst which remains undiscovered and unrelieved. Moreover, the very abundance of charitable agencies, coupled with lax administration, tends to an increase of an undesirable class of citizen, and that in two ways; firstly, by attracting to the city large numbers of the vagrant and loafer class; and secondly, by discouraging the virtues of self-help and thrift.

At a conference of representatives of charitable institutions and societies held in Edinburgh in May of last year, a committee was appointed to consider and report on the system of poor relief which appeared to be best suited to the requirements of Edinburgh. The outcome of the work undertaken by this committee was a scheme for the formation of a new Society by an expansion of the existing Association for Improving the Condition of the Poor. It has been arranged to make the Council of the new society as representative as possible. Thus it is proposed that there shall be upon it, in addition to representatives of the various existing charities, representatives of the Town Council, the Merchant Company, the Parish Council, the School Board, the Trades Council, and the Friendly Societies. The new agency is to be termed the City of Edinburgh Charities Organisation Society. A public meeting is to be held about the beginning of March for the purpose of bringing the Society and its objects before the public.

In promoting a scheme of charity organisation in Edinburgh it was feared that a good deal of opposition would be met with, but, so far as the work has yet gone, there appears to be a praiseworthy disposition on the part of the agents of the various charities to do what they can to smooth away difficulties and to recognise the fact that more good can be effected by union than by division. The scheme as at present outlined falls short of that so ably advocated by Miss Sutter in "England's Next Campaign," and in the columns of the *Scotsman*. Perhaps the latter was too German for importation *in toto* into this country. But, at any rate, a step has been taken in the right direction, and it is to be hoped the future will see in Edinburgh a well developed scheme of poor and sick relief wherein the fullest possible advantage will be taken of existing charities.

The Wastage of Child Life.

IT will be remembered that a few months ago the newspapers published a somewhat sensational paragraph to the effect that the Mayor of Huddersfield had greatly reduced the infantile mortality of that town by the very simple expedient of paying one guinea to every mother who succeeded in bringing her child to the age of one year. That this statement has excited some interest was evident from the large audience which assembled last month to hear Mr Broadbent speak for himself when he came to Edinburgh at the invitation of the Parents' National Educational Union. Mr Broadbent's lecture clearly showed that he has taken up the question of infantile mortality very seriously.

After explaining how the infantile mortality indicates the health conditions prevailing in the neighbourhood, the lecturer

went on to say that every life lost pointed to many lives injured, and suggested that many of the unfit had been rendered unfit by the unfair treatment which they had received in infancy. A high death-rate and a degenerate people went together; they were two symptoms resulting from the same evil source. Every baby that was born should have a fair chance of living. He was convinced that the loss of infant life was really wastage, for the reason that nearly all babies were born healthy, and would live if they got a chance. It was merely a matter of conditions surrounding the babies, as was shown by the fact that in one part of a town 95 babies out of 100 survive to one year, while in another part of the town only 60 out of 100 survive. It was his belief that two out of every three babies that passed out of life did not die: they were killed. It was not that they could not live: it was that they were not allowed to live. It was the conditions that were at fault, not the babies. The only obstacles in the way of saving them were ignorance and indifference. If these were removed, the battle was won. Overcrowding, slumdom, defective milk supply, employment of married women, were secondary causes in producing such dire results for child life and health. The mothers were not to blame. They were the unwilling and unwitting instruments of an indifference and ignorance on the part of those who ought to know, and ought to make it impossible for a woman to grow up in such cruel ignorance of the possibilities of her own life and work. They had had compulsory education in force for nearly thirty-five years, and the result was that mothers to-day were as a rule totally ignorant of the elementary duties of motherhood. Whose fault was that? He could say some strong things, but he would at least acquit the poor mothers. They did not let them stay at home where they might learn the duties of motherhood. They made them go to school, where they were taught nothing, and then, as soon as they were able, they were sent out to work. Could they in their hearts blame them if they were so ill-equipped to bring their babes safely through all the perils of infant life?

As to remedy, his plan was to help the mothers in their own homes to feed, tend, and care for their infants. Whatever they did for the children must be done through the mothers. The mother was the natural and only efficient and sufficient guardian for the child. In Huddersfield they offered one shilling for each prompt notification of a birth, and they got from the registrars notices of other births. The Corporation had appointed lady health visitors whose duty it was to pay a visit to the home as promptly as possible and leave a card of advice. After the visit of the lady health visitor the care of the baby was, so to speak, handed over to the charge of a voluntary organisation which embraced

the whole town within its operations. The town had been divided into districts, and over each district was a superintendent to whom the official ladies sent lists weekly of the babies born in their districts. The superintendent allotted the babies to helpers. The helper was then in charge of that baby, and it was her duty to visit it periodically and keep a friendly eye upon it. This was not a charity, and it was a rule that the lady visitors should not administer charity at all. They were, however, trying to bring into co-operation with the Public Health Union all the charitable institutions of the town, and cases requiring sanitary attention and the like would be brought before the health and sanitary officials. So far as they had gone as yet, they had had every reason to be satisfied with their success. The mortality amongst babies who had been watched over in this way had been very small indeed.

From this very brief résumé of Mr Broadbent's remarks, it will be seen that the Huddersfield scheme is much more far reaching, and at the same time much more rational, than was indicated in the first newspaper accounts. The plan of exercising some sort of public supervision over every baby that is born in the poorer parts of a town has much to commend it, and if wisely carried out the plan of thus providing a sort of municipal god-mother seems almost bound to be attended by good results. A somewhat similar scheme has recently been reported as having been carried out in the little village of Villers-le-Duc, in France. In this village the population seemed likely to die out altogether, so great was the infantile mortality; but when the authorities instituted a scheme of public guardianship, the infantile mortality fell to nil!

It is evident that these two schemes, that of Huddersfield and that of Villers-le-Duc, have something in common with the Elberfeld system which has recently been pressed so persistently on the attention of the Edinburgh public, inasmuch as they both recognise the fact that we are our brothers' keepers. No doubt a very great deal would depend upon the knowledge, sympathy, and tact of the lady visitors in carrying out such a scheme as Mr Broadbent has inaugurated, and there are people even amongst those most in need of supervision who would resent their visits as an unwarrantable intrusion. We suppose it is just here that Mr Broadbent's guinea becomes useful, for if it is looked upon in the light of a prize, it is obvious that competitors must submit to the conditions imposed, even if these conditions include lady visitors for the mothers and an unusually monotonous diet for the baby.

Mr Broadbent's remarks on education will be received with sympathy by the medical profession, for, indeed, it is not very

long since the profession itself pressed the same matter on the educational authorities, but, unfortunately, with little success. Indeed, we were met with the curious argument that it was impossible to carry the suggestions into effect, as there were no teachers available. A curious argument, we say, for there can be few districts where there are not some young doctors who have the necessary knowledge and who are not too busy for work of this kind.

Whether any practical result will follow Mr Broadbent's lecture remains to be seen. No doubt this will partly depend upon the further results of the Huddersfield experiment. But, in the meantime, there are several agencies in Edinburgh, such as the Social Union, which might very well try a similar experiment of their own. Such an experiment might be begun by supervising, for a year after birth, the babies whose mothers are attended in their confinements by the Maternity Hospital and by the various Dispensaries in town. Illegitimate children, also, should be specially supervised, as the mortality amongst them is greater than amongst legitimate children. Indeed, a law should be passed making the supervision of such children compulsory when they are in the charge of strangers. Mr Broadbent came to Edinburgh at the invitation of an influential body specially interested in all that concerns the wellbeing of children, and it is much to be hoped that his visit may lead to some salutary steps for the amelioration of child life in the city.

The Huddersfield Experiment.

IT may be of interest, in connection with the last note, to recall the details of the Huddersfield experiment, which were communicated a short time ago to the *Times*. The experiment was carried out in the Township of Longwood, which now forms one of the wards of the Burgh of Huddersfield. This township has an area of 1334 acres, and the population is 5359. There is no congested population, and there are no slums. Most of the population are factory workers, but very few of the married women go out to work. The death-rate for ten years has averaged 13.44, and the birth-rate 19.39; while the infantile mortality has been 122 per 1000 births.

The experiment took the form of a promise to pay £1 to each baby born in the district between November 9, 1904, and November 9, 1905, on its attaining the age of one year. The promise was made by means of a promissory note, printed on a card, on which was also given much good counsel. By means of the card the lady health visitors obtained admission to the homes, and paid visits periodically, helping the mothers with advice and sympathy. At the beginning of the diarrhœal

season, and at the onset of cold weather, short personal letters of advice were sent to the mothers through the post.

Simple as the machinery seems, the results, so far, are striking. The average infantile mortality for ten years is 122; for the twelve months' period referred to the figure is 54. In other words, coincident with the measures described, the infantile mortality is less than half the average. This is only an intermediate stocktaking, but there is no reason to anticipate a less favourable result when the whole period has been covered.

The Milk Supply of Schools.

CONCLUSIONS, most interesting and yet most disturbing to the preconceived ideas of many, are supplied by the Consulting Medical Officer of Haileyburn College, and issued in pamphlet form by the Medical Officers of Schools Association. The inquiry was the outcome of a recommendation which, it was suggested, should be pressed on the authorities of all schools, the chief requirement being the institution of some method of sterilising milk on the school premises before its consumption.

As a result of this inquiry, answers were received from 41 schools, representing 203,385 yearly observations on some 33,894 individual pupils whose ages varied from 4 to 19½ years. Through milk supplied to these schools the following diseases have been traced:—

Disease.	Cases.	Per cent. per Annum.	Percentage of Pupils.
Enteric . .	20	.00098	.0059
Diphtheria . .	10	.00049	.0029
Diarrhœa . .	50	.00245	.0145
Sore throat . .	75	.00367	.0217

Dr Shelly classifies the schools as follows:—

1. Twelve schools where special precautions as to the milk were taken, *e.g.* cows tested by tuberculin; the milk sterilised or boiled on the school premises. The number of pupils amounted to 11,408, and corresponded to 68,455 yearly observations:—

Disease.	Cases.	Per cent. per Annum.	Percentage of Pupils.
Diarrhœa . .	50	.0073	.043
Sore throat . .	35	.0051	.036

2. Special but only partial precautions taken with the milk, *e.g.* occasional or partial boiling of the milk on the school premises; supervision of the dairy farms supplying the milk;

addition of untreated cream to boiled milk, etc. Fifteen schools were so supplied, containing 14,519 pupils, and corresponding to 87,110 yearly observations :—

Disease.	Cases.	Per cent. per Annum.	Percentage of Pupils.
Diphtheria . .	10	.0011	.0068
Sore throat . .	40	.0044	.0272

3. Fourteen schools where no special precautions were taken. The milk was obtained from a general outside supply. These schools represented 8161 pupils, and corresponded to 48,970 yearly observations :—

Disease.	Cases.	Per cent. per Annum.	Percentage of Pupils.
Enteric . .	20	.00408	.0244

This outbreak of enteric, however, was caused by the pupils eating strawberries and cream at a shop belonging to the dairy farm which supplied the school.

4. Seven schools where precautions were taken to safeguard the supply, but where no special treatment of the milk was carried out on the school premises. These represented 3291 pupils and 22,730 yearly observations, and yet the medical officers of these schools made no return of any illness caused by milk infection.

While agreeing with Dr Shelly that the above figures are too limited to allow of absolute conclusions, we may yet ask with him, what advice are we to give to the Headmasters, and where do we really stand as regards the relation of certain epidemic diseases to the milk supply?

The New Professor.

PROF. HARVEY LITTLEJOHN'S appointment to the Chair of Forensic Medicine has been received with almost unanimous approval. Since the time when, having resigned a valuable appointment in Sheffield, he came back to take up the hard and unremunerative work of an Extra-Mural Lecturer in Edinburgh, all who have been familiar with his work have looked to his receiving this recognition.

We trust that this, Captain Sinclair's first nomination to a medical appointment, is an indication of his intention to follow the admirable example of Lord Balfour of Burleigh, in none of whose appointments was any political leaning evident.

Prof. Littlejohn will be a most valuable recruit to the party in the Senate which is striving to modernise the medical curriculum.

The Scottish Universities in the New Parliament.

WHETHER they agree with his political views or not, Sir John Batty Tuke's many friends will all join in congratulating him on his return to Parliament, and those medical electors who felt it their duty to support his opponent all agree that Sir John will be a valuable member. His long experience of the General Medical Council enables him to speak with authority on medical matters, and now that Sir Michael Foster has fallen in the fight, it will probably fall to Sir John to lead the little "medical party," to which Edinburgh University contributes two more members in Dr Rolland Rainy and Dr V. H. Rutherford.

Dr W. R. Smith's assault on Glasgow and Aberdeen failed, as we always thought it would. Medicine is a most important interest, but it is not a workable political platform, and the results in the London and Scottish Universities should convince the most advanced reformers that a medical "labour" member is an impossibility.

Royal College of Physicians of Edinburgh.

AT a Quarterly Meeting of the Royal College of Physicians of Edinburgh, held on Tuesday, February 6, 1906, Dr Playfair, President, in the Chair, George Freeland Barbour Simpson, Charles Mowbray Pearson, and Edwin Matthew were introduced and took their seats as Fellows of the College.

Andrew Balfour, Khartoum, and John Dixon Comrie, Edinburgh, were admitted by ballot to the Fellowship of the College.

William Leslie Lyall and Sorab Kaikhoshru Engineer were admitted by ballot to the membership of the College, after examination.

The Registrar reported that, since the last Quarterly Meeting, twenty-six persons had obtained the Licence of the College by examination.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

By ALEXANDER GOODALL, M.D., F.R.C.P.,
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APEX-PNEUMONIA AND TACHYCARDIA

PAL (*Wiener med. Woch.*, lvi., January 1906) records two cases which he considers of importance as throwing light on the symptomatology of pneumonia and on the pathology of tachycardia. It is a tradition of clinical medicine that the symptoms of apex-pneumonia are more serious and the prognosis worse than in cases of pneumonia in other parts of the lung, but no scientific explanation for the fact has hitherto been given.

Pal holds that the serious element is introduced by the occurrence of tachycardia arising from the stimulation of cardio-accelerating fibres of the sympathetic by inflammatory products.

CASE I. A woman, aged 57, began to suffer on October 26th from headache, shivering, and breathlessness. On October 27th there was percussion dulness at the left apex, with bronchial breathing and crepitations. There were no cardiac murmurs. The liver was slightly enlarged, the spleen enlarged but not palpable. The sputum was viscous, sticky, rust-coloured and scanty, and contained the diplococci of pneumonia. The urine contained nothing abnormal. Pulse 120, respirations 28, temperature 38.5° C. For the first few days there was advancing hepatisation of the left upper lobe, later there was extension to the left lower lobe. On October 30th the pulse-rate was 142; on October 31st, 172. The temperature never exceeded 38.8° C., but the pulse on November 1st reached a rate of 210 and became irregular. There was increasing cyanosis and dyspnœa, dilatation of the right side of the heart, and death occurred from heart failure. The clinical diagnosis was croupous pneumonia of the left lung and irritation of the left nervus accelerans by inflammatory products.

A post-mortem examination revealed pneumonia of the left lung and bronchitis in the right lung. The left side of the heart was hypertrophied and the cardiac muscle showed fatty degeneration. The spleen was acutely congested. There was fatty degeneration of the liver and kidneys and chronic gastro-intestinal catarrh.

There was acute inflammatory swelling of the lymphatic glands of the neck, mediastinum, and to a less degree in the left peribronchial glands. Those in the neck were the size of peas, and lay on the sympathetic nerve trunk in a position midway between the middle and lower cervical ganglia. In the left mediastinum there was a mass of glands about the size of a small apple which in part overlay and in part surrounded the sympathetic nerve. The mediastinal connective tissue showed œdematous infiltration. The cardio-accelerating fibres on the left side were thus surrounded by inflammatory products in both neck and thorax. The corresponding parts on the right side were healthy.

CASE II. A man, aged 52, who had previously suffered from cough and excessive sweating, complained on February 13th of shivering, headache, and severe cough without expectoration, and of pain in the right shoulder. On February 14th there were herpes labialis and signs of old phthisis at the left apex, and croupous pneumonia of the right upper and middle lobes. There were no cardiac murmurs, but there was gallop rhythm. Pulse was 168 and irregular, respirations 48, temperature 38.8° C.

On February 16th the pulse was 180, and, later, while the temperature fell, the pulse-rate rose with lower blood tension. A diminution of the fever followed a gradual diminution of the pulse-rate, with an increased blood tension. Recovery occurred, although the case was a very severe one, in spite of the fact that the temperature was never high. A correct explanation of this case would be hardly possible, were the facts not examined in the light of the findings in the previous case. The phenomena are easily accounted for by a stimulation of the cardio-accelator nerves by inflammatory products. The operation of this stimulation only ended with the crisis, although it had to some extent lessened during the acute stage.

In the treatment of pneumonia the state of the blood tension should be the criterion of the patient's condition. In spite of the severity of symptoms, cardiac tonics should be sparingly used, and strophanthus and digitalis should only be given in minute doses.

The paper closes with a discussion of recorded cases of tachycardia following destructive lesions of the vagus. In most, if not all of these, the author thinks that irritation of the sympathetic is also to be reckoned with. He further refers to cases of tachycardia in which the sympathetic had been irritated by surrounding tubercular processes, while the vagus was unaffected.

The Treatment of Gonorrhœal Rheumatism by an Antigonococcus Serum.—Torrey and Rogers (*Journ. of the Amer. Med. Assoc.*, xlvi., January 27, 1906) describe a method of preparing an effective antigonococcus serum, and give reports of cases. Torrey discusses difficulties which have stood in the way of the preparation of antigonorrhœal sera. These are the absence of any immunity in man as the result of a previous attack, the possibility of acute superinfection in chronic cases, the absence of well-established cases of infection in animals, the difficulty of obtaining a luxurious artificial growth of gonococci, and the commonly accepted conclusion that animals cannot be immunised to the toxin of the gonococcus. Although the chance of success was slight, a serum was prepared at the suggestion of Rogers as a last resort in the treatment of a case of gonorrhœal rheumatism of fifteen years' standing. Both Torrey and Rogers were agreeably surprised to find the serum effective. The culture employed in producing the serum was obtained from an acute case in a male. Smears from the discharge were made on petri dishes of ascitic agar. After twenty-four hours' incubation an almost pure culture of very small transparent colonies appeared. These colonies were composed of small diplococci, in every respect identical in morphology, staining reactions and cultural features with the characteristics of gonococci.

For purposes of inoculation a very satisfactory medium is a mixture of rich ascitic fluid and slightly acid beef infusion peptone broth in equal parts.

Tubes containing about 12 c.c. of this medium are inoculated and incubated at 36-37° C., and the best results are obtained by using cultures from six to fifteen days old. About 10 c.c. of the entire culture are injected into the peritoneal cavity of large rabbits at intervals of five to six days. The rabbits are bled for the first time after they have received six inoculations, or about 60 c.c., extending over a period of about a month. About 70 to 90 c.c. of serum should be obtained. The serum remains potent after being kept in an ice box for one or two months. It is put up in sealed glass tubes holding 2 c.c., without any preservative. Torrey believes it possible to obtain an antitoxin for the toxin of gonococcus, but the most important permanent relief which the serum affords in most cases is due to a bactericidal activity. In chronic gonorrhœa there are comparatively few gonococci found deep in the tissues, but as an active immunity never arises in man to gonococcus the system frequently finds difficulty in disposing of them. It seems possible that the serum supplies enough immune bodies to accomplish this, although too few to bring about the destruction of the great

numbers of gonococci which are present in the urethra in acute gonorrhœa.

Rogers emphasises the gravity of the systemic infection which has occurred in every case of gonorrhœal arthritis. In addition to the common disorders of joints and tendon sheaths which it produces, endocarditis, pericarditis, pleurisy, and meningitis may occur. Cases of iritis, myelitis, myositis, neuritis and skin affections, and true gonorrhœal septicæmia are all mentioned as more than occasional possibilities.

One or more of the large joints, seldom those of fingers or toes, may be attacked at almost any period after the incidence of the gonorrhœa, the usual time being between the first and eighth week. It is generally considered necessary for the infection to have extended to the deep urethra before a systemic invasion can occur; but this belief is untenable, as there is on record a case of gonorrhœal arthritis in an infant which followed a gonorrhœal ophthalmia.

Experience seems to prove that practically every joint lesion which arises in the course of a gonorrhœa, even when there are no signs of the original disease except a few gonococci in the shreds obtained from the urethra, can be pretty safely attributed to this organism.

Ordinary polyarticular rheumatism and other arthritic troubles can be considered only after the gonorrhœal arthritis is excluded. Differentiation from tuberculosis is the most difficult; but the X-rays should show the usual osseous character of this process, which almost never occurs in gonorrhœa, and if this fails no harm can come from a trial of the anti-gonococcus serum. The question of diagnosis needs considerable emphasis, as many cases, especially in women, escape detection. The ordinary anti-rheumatic treatment is notoriously unsatisfactory. Freely opening and washing out the joints with antiseptics has given somewhat better results, but unless suppuration is present it only slightly accelerates recovery and imposes the risk of a mixed or pyogenic infection. In every suspicious case from 20 to 60 minims of the antigonococcus serum should be administered every day or every other day, beginning as early as possible after the arthritic complications appear and continuing till the pain and disability subside. It has usually been injected into the back of the upper arm. There is generally a noticeable improvement at the end of 24 or 36 hours, and within a week or ten days there is an almost complete subsidence of the disorder if it is acute. After the suspension of the treatment there is a constant danger of recurrence, especially if the urethritis persists and the injections may have to be repeated. After the inflammatory process has continued for weeks or months and

new tissue and adhesions have formed, or if destructive lesions have developed, the restoration to a normal condition may be slow or may never occur; but even in these cases the serum will produce a more or less rapid subsidence of the inflammatory symptoms and pain. The stiffness must be overcome by passive movement, massage, etc. This method of treatment has the same limitations and disappointments as all serum therapy and is not advanced as an infallible remedy. An occasional erythema has been the only ill effect ever produced. The serum has little or no effect on the urethritis. The serum obtained from the first bleeding does not seem to be so good as that from the second or third, and even with the same serum some patients react better than others. Eight cases treated with the serum are recorded. Their essential features may be briefly noted.

CASE I. A man, aged 35, had gonorrhœa seven years ago. Another attack began on April 8th, and on April 22nd, pain in the left knee began and the joint became semi-flexed and tender with little effusion. There was profuse urethral discharge. On April 24th serum treatment was begun. On April 26th the pain had gone and patient could walk. On April 30th a recurrence of pain was followed by another injection of serum. No further symptoms occurred.

CASE II. Man, 34, profuse discharge for 3 weeks; swollen, painful knee for 4 days. On three successive days 40 minims of serum were injected. Cure was complete in eight days.

CASE III. Man, 22, had severe arthritis in knee and shoulder three days after infection. Cure was rapid. Recurrence took place in the knee, but symptoms had all disappeared in less than a month.

CASE IV. Man, 29, infected in March; left wrist swollen and painful in June, with atrophy of muscles of forearm. After eight injections only slight limitation of movement remained.

CASE V. Man, aged 34, with subsiding discharge; painful, swollen wrist and temperature of 102° F. Serum treatment dissipated the acute symptoms, but the wrist remained incapable of use although mechanical treatment might in time effect improvement.

CASE VI. Girl, 17, had large swellings of knee and wrist, with gonococci in the pus from the cervix. The slightest movement caused pain. After the third injection the wrist lost all pain, walking became possible after 20 days, and the final result was only a limitation of the movements of the knee.

CASE VII. A man, aged 34, had suffered from several attacks of gonorrhœal urethritis between 1893 and 1899. The metacarpo-phalangeal joint of the left index finger then became

swollen and painful. The urethritis continued. In 1901 the right knee became swollen and painful, and thereafter joint after joint became affected. For six weeks samples of serum from many rabbits were used, but the treatment was a frank failure. Gonococci were never demonstrated, but the history and the co-existence of urethritis and arthritis made a diagnosis other than gonorrhœal rheumatism very improbable.

CASE VIII. Man, aged 39, had gonorrhœa in 1887, followed soon after by arthritis in the left and then the right knee. Other joints became involved, iritis supervened, and by 1904 patient had become bedridden. The only joints not affected were the temporo-maxillary and those of the toes. He had to be fed by a nurse, and suffered great pain. It was this case which prompted the work which resulted in the serum treatment. Injections of serum were made twice a week in January 1905. The inflammation and pain subsided, and the medication was stopped.

In February pain reappeared in the wrists, and injections were again given in March.

In April he could feed himself and smoke a pipe. Massage was begun, and in October 1905 he could sit in a chair for the first time in many years. A great deal of bony anchylosis and partial blindness remained, but the freedom from active inflammation and pain is a remarkable gain.

SURGERY

By HENRY WADE, F.R.C.S.Ed.,

Conservator of the Royal College of Surgeons Museum

PREVENTION OF PNEUMOTHORAX IN OPERATIONS ON THE CHEST

THE NEGATIVE PRESSURE METHOD BY SAUERBRUCH'S PNEUMATIC CHAMBER

THE chief difficulty which the surgeon has to contend with when he would attempt the treatment of intrathoracic disease by operative interference is one which is peculiar to the thoracic cavity.

Collapse of the lung and the production of a pneumothorax from the entrance of air into the pleural cavity due to a lesion of the pleural membrane is the ever present danger with which he has to contend.

The danger to life which is associated with the collapse of the lung arises not so much from the sudden loss of function

in that organ, as from the severity of the shock which is associated with the sudden diminution of volume which occurs.

As a result we find that, despite the great advance which has taken place in all departments of surgery in recent years, Thoracic Surgery has still a very limited field of operation.

Quincke, the founder of modern lung surgery, has obtained a certain degree of success, and even before his pioneer work in 1896, abscesses and gangrenous foci of the lung were successfully incised and drained.

Sub-pleural tumours had been successfully removed. Portions of the chest wall and pleura which were adherent to and infiltrated by mammary carcinoma have been successfully excised along with the primary neoplasm. All operations on the œsophagus by the transpleural route have, with the exception of Enderlen's case, where he successfully removed a foreign body from the thoracic œsophagus, ended fatally.

But even with the special technique which has been since added by von Garre, W. Müller, Reclus, and others, the fear of pneumothorax and its attendant dangers still remain and have still successfully to be overcome.

Of the recent investigations which have been conducted to find a method capable of practical application which will do away with the well-known dangers to life which arise when any operation is performed by the transpleural route, we desire especially to mention those of Sauerbruch. His work cannot claim so far to have got much beyond the stage of an experimental investigation. But from the promise which it offers of a successful solution of this important problem, it merits a careful study by the practical surgeon.

We need not follow him through the record of his work, which concerns itself solely with the physiology of normal respiration and the effect which it produces on the circulation of the blood, nor with the explanation of the serious consequences which follow the induction of pneumothorax; suffice it to say that during respiration we have the heart and other intrathoracic organs working under a minus atmospheric pressure. The lungs are maintained in contact with the parietal pleura mainly by the atmospheric pressure exerted upon them from within. Should the pressure on their outer surface be rendered equal to that within by any lesion of the pleural membrane, the elasticity of the lung, which tends naturally to draw it towards its root, causes it to collapse and to remain so. This leads to an interference with the return of blood towards the right ventricle and a consequent serious danger to life.

What Sauerbruch set out to accomplish was to devise a

practical method whereby the atmospheric pressure on the chest walls from without could be so reduced that when the pleural cavity was opened it would be equal to, or slightly less than, that of the minus pressure on the outer lung surface.

The first apparatus which he experimented with on dogs was a simple glass cylinder, long enough to reach from the animal's neck to its abdomen. Across either end of this was stretched a rubber diaphragm, perforated and so contrived that it fitted closely round the animal's neck and abdomen and round the arms of the operating investigator, which were thrust through it. The air within this closed cavity, which contained the thorax of the animal and the hands of the operator, was then exhausted until the pressure desired was obtained. On opening the chest cavity now, it was found that instead of the usual collapse of the lung occurring with its alarming consequences, the lung remained expanded and the animal's respirations were not accelerated. On, however, the membrane being accidentally ruptured and air at a normal atmospheric pressure admitted, the lung at once collapsed and the animal died in consequence.

From this simple contrivance there was gradually elaborated, step by step, an apparatus which, whilst achieving the desired effect—a minus atmospheric pressure on the chest wall from without, along with the normal atmospheric pressure upon the lung surface from within—would allow the operating surgeon to work under better circumstances than was the case in the original experiment, where his wrists were handcuffed through the rubber membrane. The final result is Sauerbruch's Pneumatic Chamber, as one sees it fitted up in one of the side-rooms of the operating theatre of the Surgical Clinique in Breslau.

This pneumatic chamber is a small room with walls made of strong glass and two doors arranged like the double doors of a photographic dark room ; the object of the latter being to allow anyone to be admitted into the chamber when an operation is in progress. The chamber, which is really a small operating theatre, is large enough to allow of a patient lying down extended on an operating table, and the surgeon and his assistants being comfortably accommodated within.

In the wall of the chamber opposite the door there is placed an opening which is fitted with a rubber collar, and through this the patient's head is passed, so that it rests on a ledge on the outer aspect of this wall. Within the chamber there is also fitted up a connection with a large exhaust pump, and by means of this the air in the chamber is exhausted to the requisite pressure required. There is also present inside the pneumatic chamber, or operating room, a large arc lamp and a telephone. The latter is rendered necessary (should the surgeon desire to

communicate with the anæsthetist outside) by the thickness of the glass partition and the noise created by the exhaust pump.

When in use for an operation where it is the intention of the surgeon to open the thoracic cavity and avail himself of this means of preventing lung collapse, the routine observed is as follows:—

The pneumatic operating room is prepared by the theatre sister and nurses in the usual way; all the necessary requirements, by way of instruments, lotions, and dressings, are arranged inside. The patient, who has been previously anæsthetised, is then introduced. He is transferred to the operating table within and his head passed through the aperture in the outer wall and the rubber collar fitted to his neck. It is found that this need not fit with any special accuracy, as any slight leakage of air past it into the chamber is immaterial. To limit as far as possible to the thorax the surface of the patient's body exposed to the negative atmospheric pressure, his abdomen and lower limbs are encased in an air-tight sack, from the lower end of which a tube passes to the outer air. The surgeon and his assistants are then admitted into the chamber and the doors closed. The exhaust pump is then set in motion and the air in the chamber rarefied, until the manometer indicates a pressure such as is reckoned sufficient. The question naturally arises, what effect has this rarefaction of the air got upon the surgeon and his assistants, who are also subjected to it. Having had the experience of being present within the chamber when such an operation was being conducted, the writer can state that no discomfort is felt, except occasionally when, owing to a sudden rise or fall of the pressure, a sensation of discomfort is felt in the ears, which is explained by the pressure within the tympanic cavity not accommodating itself here so quickly as elsewhere.

The surgeon now proceeds with the operation, and should he find that, owing to the atmospheric pressure within the chamber being too much reduced, the lung bulges out at the wound instead of collapsing, he can increase the atmospheric pressure by the simple arrangement of turning the handle of a water tap which regulates the pressure.

When the operation is finished and the pleural cavity carefully sealed, the exhaust pump is stopped and the pressure gradually allowed to rise to the normal level again. The patient is now sent back to the ward.

Another method which may be adopted to prevent the production of pneumothorax during operation is the positive pressure method. This may be obtained by using Sauerbruch's pneumatic chamber and reversing the arrangement for its use. The patient's head and the anæsthetist are introduced into the chamber, the

patient's body being without. By reversing the engine of the exhaust pump the atmospheric pressure within the chamber is increased instead of diminished. This method will certainly serve to prevent pneumothorax, but although more convenient for the surgeon, it is for various reasons not to be recommended. This positive pressure method is especially advocated by Brauer, who has devised an apparatus which will enable it to be carried out. His method has this to recommend it—that the apparatus used is of much smaller bulk and less complicated. It is to be preferred if the effect on the patient was equally good.

According to Brauer the two methods are identical in their action and effect once the chest wall is opened. This, however, would appear to be, unfortunately, not the case.

The degree of success which has attended the use of Sauerbruch's pneumatic chamber and the negative pressure method for the prevention of pneumothorax during intra-thoracic operations has been so far considerable. In it we have a method by means of which the territory unconquered still by surgery may be successfully invaded. Operations on the thoracic wall and the thoracic portion of the œsophagus will be by it greatly facilitated. Removal of mediastinal new growths may be attempted; abscesses, gangrene, and wounds of the lung will be able to be treated with a greater prospect of success.

To facilitate its use in lung surgery, however, it will be necessary to devise a means whereby the partial collapse of the lung, which occurs naturally when the visceral pleura is wounded, will be prevented, and a lung suture which will be air-tight by the time the patient is sent out of the operating chamber.

These difficulties, though serious, are not insurmountable, and when such has been done a valuable addition to the technique of thoracic surgery will have been found.

DISEASES OF THE EAR, NOSE, AND THROAT

By R. MACKENZIE JOHNSTON, M.D., F.R.C.S.,
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and

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Acute Middle Ear Suppuration.—This subject has been widely discussed of late in this country, in America, and on the Continent.

Dr A. K. Gordon, Medical Superintendent of the Monsall

Fever Hospital, brought the subject before the British Otological Society in June 1905.[1]

He states that of 1800 cases of scarlet fever admitted to the Monsall Fever Hospital in one year, 394, or 20 per cent., suffered from discharge from one or both ears, and that many cases of scarlatinal otitis media are discharged from fever hospitals in general with profuse purulent secretion; they are, however, advised to attend a special hospital for treatment.

Otologists have informed Dr Gordon that they see comparatively few cases of acute scarlatinal otitis media; on the other hand, he is of opinion that from one-half to three-quarters of all cases of suppuration in the temporal bone, which eventually come to the operating table, are due to scarlatina. The author regards the treatment of acute suppurative otitis media in isolation hospitals as generally inadequate.

The discharge in these cases is usually so profuse as to render it unlikely that the tympanum alone is affected; and, although external signs of mastoid implication are rare in scarlatina, Dr Gordon thinks that the mastoid antrum, and probably the cells also, are infected from the first. He notes three cases in which a post-mortem examination revealed carious bone and fœtid pus in the mastoid without perforation of the membrane and discharge from the ear.

In many cases the otorrhœa, which had ceased at the time of the child's discharge from hospital, recommenced shortly after, and it was noted that other children at home became infected with scarlatina apparently from the recurrence of this otorrhœa. Dr Gordon thinks that in these cases there was a temporary blocking of the discharge in the antrum and cells, due to granulation tissue in the aditus, and that increase of pressure caused this tissue to give way and so re-established the otorrhœa.

As regards treatment, Dr Gordon insists on efficient antiseptic syringing during the period of otorrhœa, along with removal of the adenoid post-nasal growths, if present: this operation should be performed during the acute stage if there is any retention of secretion in the naso-pharynx, and, in other cases, a week or fourteen days after the temperature has fallen to normal. It is not easy to see how the presence of retention is diagnosed in these cases, and why the operation should not at once be performed in all such cases in which marked adenoid post-nasal growths are present, in order to provide better drainage for the middle ear cavities.

The removal of carious teeth is also recommended to improve the condition of the mouth.

[1] *Journal of Laryngology, Rhinology, and Otology*, October 1905.

When otitis occurs the ear should always be inspected and the perforation, if small, should be enlarged, or an incision made in a position more suitable for drainage.

Such small operations as intra-tympanic douching, curetting, inflation of the eustachian tubes, and removal of ossicles proved disappointing in their results, and Dr Gordon therefore took to opening the antrum to provide better drainage.

Even this proved unsatisfactory as regards duration of after-treatment, permanent cure of the otorrhœa, and subsequent hearing power.

Accordingly, Dr Gordon commenced to perform the radical mastoid operation in all cases that resisted intra-tympanic treatment for from two to five months: out of 18 cases he has had 16 cures, 1 failure, and 1 death. He acknowledges that 18 cases is too small a number to base an opinion upon as to the necessity of the radical mastoid operation in cases of scarlatinal otorrhœa which resist ordinary measures.

In the same copy of the *Journal* there is a report of the communication by Dr W. Milligan, delivered at Leicester in July 1905. The subject is—"The lines of treatment in preventing acute middle ear suppuration from becoming chronic."

Dr W. Milligan is also of opinion that the want of energy and efficiency in the treatment of acute otitis media is the explanation of the large number of cases of chronic suppuration in the middle ear. He asks, "At what time does an acute process become chronic?" and gives the practical answer, "When the recognised treatment adopted for its relief as an acute condition has failed to modify the progress of the disease."

After mentioning the general measures to be adopted in cases of acute otitis media, he discusses the local treatment. This consists in (1) cutting short the inflammatory process before exudation occurs, and (2) the endeavour to prevent septic contamination of the exudation if this exudation already exists. He is strongly against the use of Politzer's bag or the eustachian catheter in these cases, for the reason just stated, and in this view he has many supporters. Professor Politzer, on the other hand, does not believe in the bad effects of the air douche.

Dr Milligan states that the transition from a non-purulent to a purulent exudation in the middle ear is shown by a rise of temperature, increase of pain, swelling and œdema of the membrane, a yellow colour seen through the membrane, and occasionally by pulsation.

Spontaneous perforations are too often small and insufficient for drainage: a free incision should therefore be made as soon as the normal plane of the membrane is altered, and should be

kept open as long as secretion continues to be formed in the middle ear cleft; after paracentesis the fluid should be aspirated out of the cavities and the meatus packed with gauze.

Dr Milligan mentions 28 cases of acute otitis media thus treated—all the cases recovered—the membrane was healed in periods averaging about 10 days, and the result as regards hearing was "good" in 20 cases, *i.e.* normal hearing was re-established.

Bacteriological examination of the pus in these cases is very important: cases due to staphylococcic infection (from 60-70 per cent.) prove amenable to local treatment; streptococcal infections are much more difficult to deal with, and Milligan believes that these latter cases, if they resist paracentesis and drainage, should be treated by opening of the mastoid antrum.

The author next refers to suppuration in the attic, and states that these cases afford good examples of the bad effects of imperfect drainage, *e.g.* pain due to the pressure of pent up pus, and necrosis of the ossicles and outer attic wall: the lower tympanic cavity is usually shut off and the hearing power often good. Such cases are liable to become chronic unless treated by removal of the outer attic wall or by drainage of mastoid antrum; as the thin bony wall forming the roof of the attic is also the floor of the middle fossa of the skull, the need for free drainage is evident.

Dr Milligan notes the fact that in many cases the floor of the antrum is situated at a lower level than the floor of the aditus, thus causing a backfall in the drainage of this part of the middle ear cleft: he asks what steps the surgeon is to take when, on account of the excessive amount of purulent secretion constantly reappearing through the perforation after repeated drying of the membrane, he recognises that the antrum is diseased.

His answer is that cases which have resisted free incision of the membrane and drainage for three weeks should be operated on, and that the mastoid antrum should be opened. He mentions 56 cases successfully treated in this way: in many of these cases there was no elevation of temperature, no great discomfort or pain, and no vertigo. He looks on a high pulse-rate as more important than elevation of temperature. Exanthematous cases should be treated in a still more active way, and if paracentesis and gauze drainage fail to arrest or markedly modify the purulent secretion in seven days, the mastoid antrum should be opened and the adjoining subcortical cells cleared out. To wait for œdema over the mastoid, and to continue the use of lotions, powders, etc., which cannot possibly reach the whole of the affected area, is simply to court chronicity.

Dr Milligan, however, hesitates to agree with Dr Gordon in

advocating the radical mastoid operation, as he has found the operation for acute mastoiditis so successful in these early cases.

Mr E. B. Waggett, continuing the discussion, said that he did not believe in paracentesis as a routine practice in cases of serous otitis media.

In muco-purulent catarrhs of the tympanic cavity depending on the condition of the naso-pharynx, and frequently recurring, he believes in hot carbolic and glycerine drops: the strength should be not more than 6 grains to the ounce, though many otologists use stronger solutions. Immediate removal of adenoid post-nasal growths is insisted on in all these cases.

Mr Waggett is also opposed to Politzerisation, and says that one might as well try to remove the crumbs from the table by forcing a draught down the dining-room chimney, as try to remove all pus from the middle ear by using Politzer's method.

Early and free incision is advocated in suitable cases, and also copious irrigation of the meatus: the patient should be kept in bed for three or four days after the discharge has ceased, and glycerine and carbolic drops used every night as a routine method.

Politzer's method should only be used fourteen days after all redness of the membrane has gone.

The acute cases which become chronic belong, according to Mr Waggett, to two groups:—

(1) Those with a perforation of Shrapnell's membrane.

(2) Those with a swollen Shrapnell's membrane, and a perforation in the postero-superior quadrant.

The first group should be treated by attic syringing or removal of the outer attic wall. The second group really consists of early chronic cases, and the mastoid operation should be performed.

Atrophic Rhinitis.—In *The Polyclinic* for October 1905, Mr Chicele Nourse defines this condition as one in which we find inflammation of the nasal mucous membrane, with a tendency to crust formation on, and atrophy of, the nasal tissues, although there is no definite ulceration or necrosis.

Mr Nourse distinguishes between atrophic rhinitis and ozœna: ozœna includes any condition in which there is a discharge from the nose accompanied by an offensive smell, though the word ozœna is often used to describe cases of atrophic rhinitis with fœtor.

Atrophic rhinitis itself is commonest in the young, and more often met with in females than in males. On looking into the nose one sees the characteristic crust formation, and it is only on removal of these crusts that the atrophy of the nasal tissues

is made visible: the mucous membrane is then seen to be as a rule dark red, though sometimes pale, and to show bleeding points and also small yellow areas; one observer has watched these yellow patches at intervals for several hours, and has seen them gradually extend and coalesce, and ultimately result in the typical crust formation before noted.

In atrophic rhinitis the patient's sense of smell is much impaired or lost, but fœtor of the breath is by no means constant.

The atrophic process may be unilateral, or may even affect only one part of the nose; the inferior and middle turbinal bodies are usually markedly atrophied.

Microscopically the columnar ciliated epithelium of the nose is seen to be replaced by squamous epithelium, and the secreting glands and adenoid tissue to be atrophied; the blood supply of the nose is much diminished. One observer has compared the action of the crusts in the nose to that of a collodion film, which rapidly dries and contracts, and so exerts continuous pressure on the nasal structures, thus causing atrophy.

As regards the etiology of the disease, Nourse gives the following table:—

(1) *Mechanical.*
- Undue patency of the nasal passages (Zaufal-Meisser).
- Congenital narrowing of the nasal fossæ (Sauvage-Tillot).
- Shortness of the nasal fossæ (Hopmann).

(2) *Bacterial.*
- Lowenberg-Abel bacillus.
- Pes-Gradenigo bacillus.
- Pseudo-diphtheria bacillus (Belfanti, Vedova).
- Cocco-bacillus fœtidus ozœnæ (Perez).

(3) *Constitutional.*
- A tropho-neurosis (Bayer, Woakes, Watson-Williams).
- A dyscrasia (Hutchison-Meisser).

(4) *Pyogenic.*
- Accessory sinus disease (Michel).
- Any focal suppuration (Grünwald-Hajek).

(5) Atmospheric dessication, followed by bacterial invasion.

Nourse himself seems to agree with Grünwald and Hajek. He says that the purulent discharge sets up chronic inflammation ending in atrophy, and attributes the failure of the general health, so often noted, to digestive disturbance and local septic absorption.

Grünwald has described 25 cases in which the treatment of the focal suppuration has resulted in the removal of the fœtor and discharge.

All cases of focal suppuration, however, are not accompanied by atrophic rhinitis, and therefore we must look for another factor. Suppurations in the frontal sinus and in the maxillary antrum are seldom accompanied by atrophic rhinitis; more commonly pus formation in the sphenoidal sinus and posterior ethmoidal cells is associated with this complaint.

Treatment.

Cleansing douches are of great importance in order to remove the crusts. The focal suppuration should next be looked for and treated.

Drs Moure and Brindel have recorded 70 cases of atrophic rhinitis treated by injections of paraffin so placed as to reconstitute the turbinal bodies.

Bronner recommends formalin as a nasal spray; he uses comparatively strong solutions.

Plugging the nostrils with gauze or wool soaked in glycerin for several hours at a time gives great relief.

Painting the mucous membrane of the nose with dilute Mandl solution, after the nose has been cleansed by means of the douche, is a very satisfactory method, and one that any intelligent patient can carry out.

℞. Iodi, grs. 6.
Potass. Iodi, grs. 25.
Ol. Menth. pip., gtt. 10.
Glycerinum, ad. ℥i.
℔.

The large number of drugs recommended in this complaint indicates the want of success hitherto attending its treatment.

The Diseased Faucial Tonsil and its Operative Treatment.—The *Laryngoscope* for November 1905 contains an article by Dr William R. Murray, of Minneapolis, Minn., in which he enumerates the results of diseased tonsils as follows:—

(1) Mechanical obstruction; (2) recurring attacks of inflammation; (3) direct extension of inflammation to neighbouring structures; (4) tonsils thus diseased act as receptacles for foreign matter and germs; (5) these germs may become disseminated by the lymphatics and blood-vessels and infect neighbouring and distant organs.

Dr Murray thinks that tubercular cervical adenitis, septicæmia, pneumonia, gastritis, septic endocarditis, and acute articular rheumatism have in many cases been traced to disease of the faucial tonsil.

The actual size of the tonsil is not to be taken as the only

indication for removal. The so-called "submerged tonsil" and the stump left after a tonsillotomy may cause as much trouble as a gland so enlarged as to be a mechanical obstruction.

Dr Murray, as we might expect, does not approve of the guillotine; he uses the snare, scissors, knife, and volsellum. He pulls the tonsil towards the middle line with the volsellum and separates the gland with knife or scissors, at first below and in front, then behind, and finally above; he then passes the tonsil-snare round the stalk thus formed—using No. 7 piano-wire—and removes the whole gland completely.

He admits that this method is followed by more reaction than the use of the guillotine—especially in adults; the after-treatment by means of sprays, gargles, and mouth-washes is important. Two cases of secondary hæmorrhage are noted, ten days after the operation. Iron internally is recommended in the after-treatment, especially in the case of children.

Local anæsthesia alone is employed in adults as a rule: $\frac{1}{20}$ grain of strychnine is first administered, and then cocaine (10 per cent.) and adrenalin solution (1 to 1000) is painted on the parts to be removed.

It is worth noting that a very large number of enlarged tonsils grow from a somewhat narrow neck, and that, in these cases, it is comparatively easy to pass the ring of the guillotine over the tonsil and to encircle the neck, and, by pressing outwards as the blade is driven home, to remove the tonsil almost entire.

It must be admitted, however, that there is a certain number of cases of tonsillar enlargement that cannot be effectively dealt with by the guillotine; in these cases Dr Murray's method should prove of great use.

Papilloma of the Larynx in Children.—In the *Boston Med. and Surg. Journ.* for October 1905, Dr J. Payson Clark has an article on the prognosis and treatment of this complaint. He states that these tumours will not yield to any form of treatment until the period of active growth has passed. The experience of Abbe, Lindt, Chiari, and Summers seems to point to the conclusion that thyrotomy, followed by radical removal of the growths, is ineffective in preventing their recurrence in young children.

Tracheotomy and non-interference with the growths is the line of treatment most generally accepted. The late G. Hunter Mackenzie was a prominent advocate of this method, and recommended tracheotomy whenever complete permanent aphonia was present, without waiting for dyspnœa.

Dr Payson Clark gives a short account of 14 cases, of whom

9 were boys and 5 girls; the age at which the affection commenced varied from birth in 1 case to 8 years. The cases were seen at periods of from 1 to 3 years after the onset of the symptoms; 4 cases were treated without a preliminary tracheotomy — of these 1 died, 1 was successful, 1 was lost sight of, and 1 required tracheotomy later.

In 10 cases a preliminary tracheotomy was performed, and of these 4 died.

The results of operative interference with the growths—with or without a preliminary tracheotomy—are so unsatisfactory that the author of the paper intends in future merely to perform tracheotomy, and to wait, either for the spontaneous disappearance of the growths, or for the child to reach an age at which radical removal of the growths is unlikely to be followed by recurrence.

Children seem to be able to wear a tracheotomy tube for years without discomfort or interference with health. Dundas Grant records the case of a girl who had worn a tube from the age of four months until she was 22 years old; at this time the larynx was filled with papillomatous growths, which were removed at one sitting and did not recur.

The author fixes the date of interference with the growths after tracheotomy at not earlier than 10 years of age.

In children, Dr Murray uses chloroform or ether, or both together, as he finds that ethyl chloride gives too short an anæsthesia; the use of the two first-mentioned general anæsthetics must add considerably to the mortality of the operation.

New Books and New Editions

Oliver Wendell Holmes and the Contagiousness of Puerperal Fever. An Address. By C. J. CULLINGWORTH, M.D., F.R.C.P. Pp. 41, with Portrait. London: H. J. Glaisher. 1906.

THANKS are due to the author for publishing his address in this convenient and extended form. It has already appeared in the Journals, and doubtless has received from many the customary hasty perusal; but, in its literary as well as its medical aspects, it is well worth a leisurely and attentive reading. It is a concise and accurate contribution to an important chapter in medical history, woven around an interesting personality. The period

covered is from 1795, when Dr Alex. Gordon of Aberdeen first demonstrated the infectious nature of puerperal fever, to the advent of Semmelweis in 1847. The history strikingly illustrates how slow is the medical mind, however sagacious it may be deemed, to acknowledge the truth and act upon it, even when the subject is demonstrated as clearly as a problem in Euclid.

A remarkable incident, not noticed by the author, is that, with Wendell Holmes as with Semmelweis, it was the death of a medical man from a dissection wound that roused the mental energy of each to investigate the cause of the pestilential disease in women: "there is no evidence that either knew of the other's work."

To those familiar with his writings, the name Oliver Wendell Holmes recalls the pleasure of many a literary half-hour spent in his company. Here he appears in a different and even more trenchant character than that of the Autocrat, or the Professor, or the Poet at the Breakfast Table; he is now "the fearless and outspoken defender of the life and health of the parturient woman." Clear and convincing is the evidence he collected, in 1843, of the direful part medical men play in spreading the disease; and yet so indifferent, almost callous, is the medical mind, that his work was neglected and, till recently, almost forgotten. The story is now interestingly unfolded in the pages of this well-written booklet, the value of which to the admirers of Holmes is further enriched by a portrait, and also an accurate bibliography of the papers referred to in the text.

This is the second contribution of the kind we owe to the able pen of Dr Cullingworth. In 1903 he gave us an equally interesting account of Charles White of Manchester. The literary side of medicine would be enriched by more of such essays on the stalwart men of the past.

The Diseases of Children, Medical and Surgical. By HENRY ASHBY, M.D., F.R.C.P., and G. A. WRIGHT, B.A., M.B., F.R.C.S. Fifth edition. Pp. 920. Longmans. 1905. 21s.

WHEN a book has reached its fifth edition it may be supposed to have established its reputation, and the reviewer need do little more than state whether or not it has been sufficiently revised and brought up to date. This much may certainly be conceded to the present issue of Messrs Ashby & Wright's well-known work. Some of the chapters have been entirely

rewritten, the others have been revised, and much new matter has been incorporated in the text. The illustrations are very numerous, and are not only very valuable from the clinical point of view, but are interesting as showing the progress which has been made in book illustration in recent years. Many of the old wood-cuts from the earlier editions are retained. Side by side with them we find numerous process blocks from photographs, and a number of reproductions of skiagrams. There are no stereoscopic illustrations, but the new three-colour process has been utilised for the frontispiece, which represents a case of tuberculous dermatitis so successfully that we cannot help wishing there were more of the same kind. As regards the letterpress, the authors have provided us with one of the most comprehensive of moderate-sized text-books on diseases of children. Good judgment has been shown as to the amount of surgical material which might usefully be included, and rare and anomalous affections are referred to without undue space being devoted to their description.

The section dealing with the Feeding of Children might, we think, have been a little more ample with advantage, and in a few places the directions as to treatment might have been made a little more explicit. In describing the method of abdominal examination, the value of chloroform should have been mentioned. In the short section dealing with Anomalies of Growth, room might have been found for a short description of pancreatic infantilism. Some surgeons may, perhaps, find Mr Wright a little conservative in places. For the treatment of hernia, for instance, operation is recommended only after a truss has been carefully tried for six months and has failed; for spina bifida the injection of Morton's fluid is recommended as the simplest and safest treatment; and his discussion of the treatment of congenital dislocation of the hip may not meet with universal approval. But the surgical, as well as the medical part of the work is of a high order of excellence, and we are sure that in its revised form this text-book will retain its well-merited popularity.

The Diseases of Infancy and Childhood. By L. EMMETT HOLT, M.D., Sc.D., LL.D. Third edition. Pp. 1174. London: Appleton. 1905. Price 25s.

THE first edition of Professor Holt's "Diseases of Infancy and Childhood" was published in 1897, and rapidly achieved recognition as one of the best works on its subject. Since the first

edition appeared, great attention has been paid to the study of Pædiatrics, both in America and in Europe, and accordingly the author has found it necessary to revise the whole work in order to bring it abreast of existing knowledge. This revision has been carried out without adding materially to the bulk of the volume, for although a good deal of new matter has been added, it has been found possible to abridge many of the old chapters. Great pains have evidently been taken over the illustrations, which now number 241, of which 25 are new to this edition.

The chapters dealing with Milk and Infant Feeding were entirely rewritten for the second edition, and give a very clear account of the American, or percentage, method of infant feeding. In consideration of the needs of those who cannot avail themselves of a milk laboratory of the Walker-Gordon type, the author has amplified, and at the same time simplified, his description of methods for the home modification of milk.

A good account of congenital hypertrophy of the pylorus has been added, but the author should have emphasised the forcible character of the vomiting, and as he tells us that the characteristic peristaltic waves are not diagnostic, he should not have left us in the dark as to what other conditions may produce them. In the treatment of the condition the value of subcutaneous saline injections is not recognised. The Junior Editor of this Journal should not be credited to Glasgow.

In the section dealing with Vaginitis, Professor Holt goes pretty fully into his unfortunate experience with gonococcal infections in children, an experience which, so far as we know, has not been paralleled in this country.

Mental defects in childhood receive more attention than in former editions. We think this section would bear still further amplification, for although very little can be done for most forms of imbecility, it is important that cases should be recognised by the practitioner when they are met with.

Important changes have been made in the articles on Cerebro-spinal Meningitis, Chondro-dystrophy, Status Lymphaticus, and Diphtheria, and in these and other places it is evident that the author has taken pains over the revision.

This new edition of Professor Holt's work can be confidently recommended to practitioners who desire a comprehensive and authoritative text-book of Pædiatrics.

A Manual of the Diseases of Infants and Children. By JOHN RUHRÄH, M.D. Philadelphia and London: W. B. Saunders & Co. 1905. Price 10s.

THIS is a small book of some 400 pages. It is intended specially for the medical student; not to supplant the larger text-book, but to enable the student to grasp quickly the more important parts of the subject of Pediatrics, and to furnish him with a rapid reference-book for clinical use. Dr Ruhräh has set himself a task which is scarcely possible of altogether satisfactory achievement. Aiming at comprehensiveness, his limits of space have made it necessary for him to be very concise in his accounts of even the most important affections of children, while the less important and the rarer often have only two or three lines devoted to them. Moreover, books of very condensed information are rarely very readable, and this is no exception to the general rule.

Nevertheless, Dr Ruhräh's work has many good points. It is accurate, well arranged, intelligible, and wonderfully comprehensive for so small a book. An excellent feature is the plan of giving references to magazine articles, so that the student may look up the subjects in the medical library. A couple of pages on "Pediatric Literature" give the student some good advice as to how to make use of the library.

Infant feeding is treated of at considerable length, and the section devoted to it is, in many respects, the best in the book. In describing how to obtain various milk formulæ by the top-milk method, the author has forgotten to state how long the milk must stand before the upper third or half is withdrawn—a very important point. In one of his tables (p. 67) he takes plain milk as containing 5 per cent. of fat. We fear this is scarcely the case in Scottish towns.

The illustrations number over 100. Most of these are original. A few are of indifferent merit, but the majority are good, and add very decidedly to the value of the book.

The book is very nicely got up—limp leather cover, red edges, smooth paper of good quality, and clear type. Misprints do not seem to be numerous. On page 66, under A, "0.20" should be "20.0"; on page 250, "usually" should be "easily"; and on page 362, Dr Payne will scarcely recognise himself as "Pogue."

A Manual of Physiology, with Practical Exercises. By G. A. STEWART, M.A., D.Sc., M.D. Edin., D.P.H. Camb., Professor of Physiology in the University of Chicago. Fifth edition. Pp. 911, with coloured plates and nearly 400 other illustrations. London: Baillière, Tindall & Cox. 1906.

THIS Manual of Physiology needs praise from none, for its first edition was issued in September 1896 and the fifth in November 1905, and it has been reprinted eight times. It keeps pace with the times. Matter becoming obsolete, and in modern science that takes place with ever increasing rapidity, is left out to give place to the latest discoveries. Thus the author has given prominence to Haldane's researches on the chemistry of respiration, and an illustration of his apparatus for measuring the quantity of carbonic acid gas and aqueous vapour given off by an animal is so well given that the student could without much trouble set up the apparatus for himself. Very properly, a full discussion of the physiology of the pancreas is given, and Pawlow's classic researches fully considered. Digestion is thoroughly discussed, and a just tribute is paid to the indomitable perseverance of Dr Beaumont, whose never-to-be-forgotten researches will always rank among the classics of physiology.

The chapter on the Central Nervous System leaves little to be desired. The practical exercises are numerous and well chosen. It is just possible that the student would prefer them printed separately, as being much more convenient for laboratory use.

Atlas and Epitome of General Pathologic Histology. By Prof. Dr HERMANN DÜRCK, Munich. Translator not stated. Edited by LUDWIG HEKTOEN, M.D., Rush Medical College, Chicago. Pp. 371, numerous coloured and black and white illustrations. London, Philadelphia, and New York: W. B. Saunders & Co. Price 15s.

WE can recommend this work as giving trustworthy information on the general nature and significance of pathological processes. In the main, the views given are those generally accepted as correct. The book is eminently readable, and is very fully illustrated.

The subjects dealt with come under the headings of Circulatory Disturbances, Retrogressive Metamorphoses, Inflammation,

Repair, and Tumours. While the treatment of all these subjects is satisfactory, we might single out as especially good the chapters on Degenerations, Inflammations, and Tumours: of the last particularly the Sarcomata, Glioma, Endothelioma, and Pigmented Nævus. The description of the varieties of sarcoma is quite the best we have seen.

The author gives only a histological classification of tumours, thus avoiding the introduction of many controversial questions. He, however, discusses in a very acceptable manner the origin of tumours and their relation to the tissues in which they grow.

Some of the opinions expressed cannot be altogether considered as generally accepted. For example, he derives blood-platelets solely from broken up red blood corpuscles, and states that this process can be followed in the mesentery of the frog during life, a rather unfortunate statement, as it is just in the frog—particularly in its tongue—that these bodies can be very readily seen as nucleated cells showing considerable distinctions from the red blood corpuscles, both in form and reactions. In the case of papilloma or papillary epithelioma, as he terms it, he holds that the connective tissue core takes the initiative in the formation of the tumour, the epithelial development being merely secondary. He describes the connective tissue in nasal polypi as characteristically myxomatous. We cannot unreservedly subscribe to these opinions. We cannot understand the following passage on p. 45: "Infarct acts like a foreign body, and dissolves particles of tissue carried into the surrounding region by the plasma, and produces inflammatory changes." Either the translator or the printer must be at fault here.

We regret that for Dürck, British medical science is a negligible quantity. In his opinion, Traube (1860) discovered the nature of anthracosis, no notice being taken of the work done thirty years previously by Christison and his contemporaries, who fully recognised the nature of the condition. Cohnheim (1867) was the discoverer of the emigration of leucocytes, no mention being made of the observations of Addison and Waller (1843-6), to say nothing of those of Dutrochet (1828). Amyloid degeneration was "first accurately described by Virchow," who, after all, was incorrect in considering the material produced a form of "cellulose." We know—as Greenfield points out—that Budd of Bristol described the change under the name of "waxy" in 1845, and in 1852 Miller of King's College, London, determined that the substance was of albuminous nature. This latter fact was not generally received until it was rediscovered by Friedrich and Kekulé.

While we regret these omissions, we must admit that they are not, after all, points of vital importance.

The translation is characteristically American, the usual freaks of spelling being introduced, while apparently some new words have been coined, *e.g.* "septicopyema," "pyema," "spatial," "inflammogenic."

With very few exceptions the illustrations are up to the standard of those we are accustomed to in Lehmann's Hand-Atlases to which this volume belongs, and this statement is sufficient to denote their excellence.

This volume, in its English guise, should prove a favourite with students and with graduates who wish to keep up and extend their knowledge of pathology.

Diseases of the Ear, for Practitioners and Students of Medicine. With fifty-four stereoscopic photographs. By JAMES KERR LOVE, M.D. Bristol: John Wright & Co. 1904.

THIS work on Diseases of the Ear, by Dr J. K. Love, of Glasgow, is a welcome addition to the numerous text-books on the subject. The author justifies the appearance of this work on the ground of the "rapid development and transition which have overtaken otology in recent years, more especially in regard to the treatment of middle ear suppuration, the operative part of which has been assiduously improved in technique." He seeks by means of this text-book to spread amongst general practitioners and aural surgeons a sense of the responsibility and knowledge required for the successful treatment of chronic middle ear suppuration.

While most text-books are illustrated by block diagrams, etc., the author has introduced a new feature in the art of illustration by inserting at the end of the volume a series of fifty-four beautiful stereoscopic photographs taken from dissected specimens of the temporal bone and surrounding parts. These photographs show in relief the actual relationship of parts, and when examined along with the text they dispel many of the difficulties which enshroud the proper understanding of this complicated bone. Opposite each photograph is a line impression, with explanatory text. Two coloured plates, illustrating normal and morbid conditions of the tympanic membrane and middle ear, are also incorporated in the work.

The book as a whole gives a good general account of the subject of otology, and especially of the subjects of middle ear

suppuration and deaf-mutism, because the author draws largely upon his own personal experiences of these diseases.

In chapter three he states the broad facts regarding the application of tones of high and low pitch in diagnosing lesions of the sound conducting and sound perceiving apparatus, but he points out that in many cases of deaf-mutism, gaps or "islands of hearing" are found to exist, and consequently the ordinary tuning-fork or whistle is not enough for testing the condition of the auditory nerve, but that a continuous tone series (Bezold's) is essential for making a more exhaustive examination of it.

The treatment of some of the nasal affections associated with ear disease is perhaps somewhat too briefly described to be of practical value, and it is to be noted that while the operation for opening the frontal sinus is not even mentioned, those for opening all the other sinuses are alluded to.

The chapters on Suppuration in the Middle Ear, with its complications, are the most important in the whole work. The complications are described at considerable length, and the operation for opening the mastoid is fully detailed. While the author advocates the mastoid operation in cases of chronic suppuration which resist well directed efforts to cure the disease, and in order to prevent the onset of complications, he might also, in our opinion, have emphasised the necessity for its performance in some acute suppurative cases in order to prevent them drifting into a chronic condition. Under "intracranial complications," a table of the differential diagnosis of cerebral abscess, meningitis, and sinus thrombosis is given, and the operative treatment is fully entered into, and a series of clinical reports of cases is appended.

The chapter on Deaf-mutism gives essentially the author's personal experience on a subject with which his name is closely associated. He has examined a large number of patients by various tests, and for practical purposes he divides deaf mutes into three classes. The distribution of the residual hearing in deaf mutes, both acquired and congenital, has also been tested, and the islands of hearing are recorded in the 33 reports of cases appended. The question of the education of the deaf and dumb receives full consideration, together with the various methods employed for this purpose in different countries. After much experience, the principle on which the author goes in educating the semi-deaf is to utilise as much as possible what hearing power remains before adopting the combined or oro-acoustic method, but, in later life, he believes that nearly all deaf mutes employ a sign language in addition to the method of lip reading.

The author is to be congratulated on having produced such

an interesting and readable book. It is eminently practical, and is free from minutiæ, so that it ought to appeal to the busy student and general practitioner, while the specialist will also find in it much to interest him. The general get-up of the book and the printing and type leave nothing to be desired, and the publishers must also receive a word of praise for having produced such a handsome volume. The work shows careful revision, as few printer's errors appear in the text. A useful formulary is added, and the index is very complete.

The Physiology and Therapeutics of the Harrogate Waters, Baths, and Climate applied to the Treatment of Chronic Disease. By WILLIAM BAIN, M.D. Durh., M.R.C.P. Lond., and WILFRID EDGECOMBE, M.D. Lond., F.R.C.S. Eng. Pp. 300. London, New York, and Bombay: Longmans, Green & Co. 1905. Price 7s. 6d.

THE authors of this volume offer to readers a somewhat exhaustive treatise on the subject of Harrogate balneotherapeutics. Not only is this subject treated in elaborate detail, but diffuse disquisitions are indulged in as regards general physiology and the treatment of a large number of chronic diseases.

A Handbook of Climatic Treatment, including Balneology. By WILLIAM R. HUGGARD, M.A., M.D., F.R.C.P. Lond.; H.B.M. Consul at Davos, Switzerland. Pp. 536. London: Macmillan & Co., Limited; New York: The Macmillan Company. 1906. Price 12s. 6d.

THIS is a most excellent book. The author is to be congratulated on having produced a work of exceptional interest, and one which claims attention by the attractive manner in which the facts are brought forward. Unlike many workers in this subject, the author displays a most broad-minded conception of the issues involved, and his chapters on "Climates and Health Resorts" are bound to prove of the greatest value to many physicians. The matter of the volume bears throughout the imprint of careful study, well balanced reasoning, and extensive experience, and can consequently be most confidently recommended to the profession.

Notes on Surgery for Nurses. By JOSEPH BELL. Sixth edition. Pp. 187. Edinburgh: Oliver & Boyd. Price 2s. 6d.

WE have recently reviewed a good many books for nurses, and have felt that almost all of them went far beyond their proper sphere, and rather taught a smattering of medicine than nursing proper. Mr Bell's book, now in a sixth edition, is really a book for nurses, full of sage advice, both medical and general. The appendix, on the relation of the trained nurse to the profession and the public, should be learned off by heart by every nurse. Mr Bell was one of the pioneers in training nurses, and no one is better qualified to give advice or gives it in a happier manner. We cordially commend the book to all nurses.

Anatomy and Physiology for Nurses. By LE ROY LEWIS, M.D., Surgeon to, and Lecturer on Anatomy and Physiology for Nurses at, the Lewis Hospital, Bay City, Michigan. Pp. 317. Philadelphia and London: W. B. Saunders & Co. 1905.

THIS is a book on Anatomy and Physiology for Nurses with the part on Nursing almost entirely left out. Few nurses could commit to memory what is given about the many muscles and bones mentioned in the book, and even if anyone had done so her nursing would be little if any the better of it. For example, in speaking of rickets (p. 15), the author says that the bones become bent or curved, either from the superincumbent weight of the body or under the action of certain muscles. This is due to some defect of nutrition, by which bones are deprived of their normal proportion of earthy matter, whereas the animal matter is of unhealthy quality. Not a word as to how the defect is to be remedied by proper food and hygiene, nor on what lines these are to be administered. In short, not a word as to the *nursing* of rickety children. The same sort of fault runs through the whole book. Thus, on page 79, under the heading "The Muscles of the Foot," is given a list of some dozen muscles and groups of muscles, and then the author adds: "While an accurate knowledge of the exact location of each of the muscles of the foot is not an absolute requisite, the nurse should, by reference to the illustrations, seek to familiarise herself with the names and their general location." Suppose she has done so—and she cannot do so from the illustrations in the book—how is the knowledge to help her nursing? The book is another of many recently published which approach the subject from the wrong standpoint.

The Historical Relations of Medicine and Surgery to the End of the Sixteenth Century. An Address delivered at the St Louis Congress in 1904 by T. CLIFFORD ALLBUTT, M.A., M.D., Hon. M.D. (Dub.), Hon. LL.D. (Glas.), Hon. D.Sc. (Oxon. and Vict.), F.R.C.P., F.R.S., F.L.S., F.S.A., Regius Professor of Physic in the University of Cambridge. London: Macmillan & Co. 1905.

THE matter of this address is excellent. Professor Allbutt has evidently searched diligently among the historical records of the past, and has made available much interesting information.

But from Professor Allbutt we are led to expect more than information. Has he not solemnly lectured us all on our slovenly style and our careless phraseology? And a reviewer would be more than human if he were not on the outlook for slips. Here are one or two quotations.

"But by the expulsion of surgery from the liberal arts, Medicine herself was eviscerated; the pernicious bisection of Medicine was made which has not yet spent its evil; the very foundation of the art was gone, and the clergy and the faculties, in France and England at any rate, devoted all their energies to shoring up the superstructure" (pp. 22, 23).

"If it be true, as I have been told, that the University of Birmingham has a coal mine upon the premises, I anticipate that the craft of coal-getting, by carrying practice into thought, will fortify the web of theory" (p. 116).

"Thus the physicians, who were cut off from the life-giving earth, being filled with husks and dust, became themselves stark and fantastic."

Patent Foods and Patent Medicines. By ROBERT HUTCHISON, M.D. London: John Bale, Sons, & Danielsson. 1894. Price 1s.

WE have already noticed Dr Hutchison's lectures in an editorial in our December number. The two lectures have been reprinted from the *Lancet*, and many will be glad to have them in the present convenient form.

All Communications—including **BOOKS** *for* **REVIEW** *and* **EXCHANGE JOURNALS**—*are to be addressed to* THE EDITORS, 7 *Manor Place Edinburgh*, AND NOT TO 43 CASTLE STREET.

APRIL 1906

THE SCOTTISH
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ACUTE DISEASE OF THE BONE IN CHILDREN

Presidential Address to the Aberdeen Medico-Chirurgical Society

By GEORGE ROSE,
Surgeon, Royal Aberdeen Hospital for Sick Children

AFTER some remarks on the work and growth of the Society during the past year, the President said: I propose to speak to-night on the subject of Acute Disease of the Bone in Children. It is a subject that forced itself on my mind after I joined the staff of the Children's Hospital, for, in operating in these cases, the pathological appearances differed so greatly from the descriptions given in the various text-books of the time, and they differed so much in apparently similar clinical conditions, that for a time I felt hopelessly at sea. Acute Periostitis, Osteomyelitis, Acute Necrosis, and Septic Arthritis were regarded in some text-books as distinct diseases with little or no relationship to each other. In other text-books, chiefly British, Periostitis was the primary disease; in Continental it was held to be Osteomyelitis. In none of these text-books was any explanation given why the end of a bone was always the part first affected, nor was there any explanation why, on operation, the medulla was often found healthy when osteomyelitis was regarded as the early disease. Equally awanting was a reason for the hip-joint being so frequently affected by acute septic arthritis, an occurrence which is invariable when the head of the femur becomes the object of acute disease. If the primary disease was either periostitis or osteomyelitis, why was not the middle of the shaft of the bone sometimes first

affected, and why might the lower end of the femur or the upper end of the tibia become diseased without the knee-joint becoming involved, when the hip-joint never escaped when the head of the femur was affected? To get an answer to these questions, and to discover the relationship, if any, of these different pathological conditions, I set about noting the various features in each case, the history of the onset, the clinical appearances, and the pathological condition found on operation, noting whether the operation was done on a recent or a late case. The result of my observations I wish to lay before you briefly to-night.

Now, this subject is of importance, from the *commonness* and from the *virulence* of the disease.

During the past twelve years I have seen, and treated, in private and in hospital, over one hundred cases of this complaint, and at the time I write we have six cases in hospital under treatment. Its *virulence* may be judged by the fact that our average mortality is over 20 per cent. Some years ago, in examining the reports of various children's hospitals, I found the mortality of the various acute bone diseases was 25 per cent.; and when we recollect that, even when life is saved, limbs are often rendered useless and are almost invariably diminished in utility, whatever leads to an earlier diagnosis, a better understanding of the disease, and a better method of treatment, is worthy of consideration. The name now given to this disease is Acute Septic Diaphysitis, a name which I would accept as being accurate and descriptive. Acute Epiphysitis is a less satisfactory name, as the epiphysis is not involved primarily, while the terms Osteomyelitis, Periostitis, and Acute Necrosis should be used to describe the results of this disease.

If it be asked how these different names for this disease have arisen, the answer is that they have been given from a mistaken view of the pathology.

When we incise, in one case we find the bone denuded of the periosteum along its whole length; in another case we find the periosteum intact but the medulla full of pus. Again, on cutting on the neck of the femur, we may find the head lying loose in the acetabulum, or we may find the head of the bone attached to the neck, but the joint full of pus. Each of these con-

ditions got a name, and no attempt was made to trace them to a common source, which would have cleared up all confusion and made the pathology and course of this disease plain and simple.

The key to a proper understanding of acute bone diseases is to be found in the anatomy and histology of the tissue adjacent to the epiphyseal cartilage. Immediately below the epiphyseal cartilage, and on the diaphyseal side, is a layer of vascular and actively-growing embryonic tissue, full of blood-vessels which terminate in loops. This layer of tissue is continuous with a like layer lying underneath the periosteum, and with a third layer on the epiphyseal side of the cartilage. We know the growth of the bone is most active on the diaphyseal side of the epiphyseal cartilage, as increase in the length of the bone is mainly from that point, and the tissue there is more tender and more susceptible to injury. Now if, on account of some injury, a small clot of blood has been formed in that situation, *i.e.* on the diaphyseal side of the epiphyseal cartilage, and any germs circulating in the blood find a lodgment in the blood-clot and set up inflammatory processes, I think we can understand the various methods by which the different pathological conditions are produced. These conditions will necessarily vary according to the bone affected, to the age of the child, to the amount of ossification of the epiphysis, and to the virulence of the invading micro-organism. Take, for example, a case where the head of the femur has become affected. Remember, the epiphyseal cartilage is intra-articular in the hip-joint. The micro-organism has found lodgment in the supposed site in the centre of the bone at the diaphyseal side of the epiphyseal cartilage, and suppuration has resulted. What course can the pus pursue as it accumulates? It must find vent, and the possible routes are:—

It may (*a*) penetrate or burrow through the epiphyseal cartilage and the epiphysis into the joint (only where the epiphysis is not ossified will this route be possible). (*b*) Burst off the head of the bone. (*c*) Pass along the surface of the cartilage, and open by a small aperture on the side of the neck of the femur, and into the joint. These three processes will, in the hip-joint, set up a septic arthritis. (*d*) In passing to the outside, the pus may burrow below the periosteum, and, passing down the shaft of the femur, set up periostitis,

and, stripping off the periosteum completely, give rise to what has been described as acute necrosis. Or again, (*e*) it may pass downward into the medulla of the bone and set up osteomyelitis. This last result is not very frequent at the hip-joint.

Suppose now a case where the lower end of the femur or the upper or lower end of the tibia has become affected, and where the germs have found lodgment in the centre of the bone at the epiphyseal cartilage. Here the epiphysis is not intra-articular. The pus, pursuing the previously-mentioned routes, may set up the same conditions, but as septic arthritis can be set up only by the pus following routes (*a*) or (*b*), and this is comparatively rare, osteomyelitis is the most frequent result, or osteomyelitis and periostitis, while septic arthritis, in the early stage of the disease, is rare. If, however, the disease begins, not in the centre of the bone, but at the surface, a frequent occurrence at the lower end of the tibia, the course is that of periostitis, as the pus tends to run below the periosteum. Only the outer edge of the epiphyseal cartilage is inflamed, and, although the whole of the periosteum may be stripped off the bone, the medulla will be found quite healthy. This explains why some cases do well after an early incision through the soft tissue. Lastly, in cases where the disease has not been treated, as time passes, on account of the vascular communication between the surface and the interior, the whole bone will become affected, and the joint sooner or later will be involved.

These are the pathological conditions found occurring in acute disease of the bone, and, by regarding them as arising from a primary acute diaphysitis, their relationship and causation may be explained. This is the view now held by those having most experience of these bone diseases, as it accounts for all conditions. In operating on early cases we may find no periostitis; we may drill into the medulla and find no osteomyelitis; but at the epiphyseal cartilage, disease, either central or circumferential, is always to be found.

And here I may point out that often there are few physical signs to be discovered in this disease, even after the constitutional symptoms have appeared. There will be pain and impairment of motion at the joint, but there need not be, in

the early stages, the smallest amount of swelling, for the pus is but small in quantity and may be deeply seated in the bone, and not until the pus finds vent or sets up secondary inflammation will there be anything discoverable other than a lack of mobility and an increase of heat.

The Causation of the disease is due to the entrance of a micro-organism into the part affected. The micro-organisms that we have found present have been the staphylococcus pyogenes aureus, the streptococcus pyogenes, and the staphylococcus pyogenes albus, and once what seemed to be the pneumococcus. Of these, the staphylococcus pyogenes aureus is the most virulent, some cases when attacked by that organism ending fatally in forty hours. Those cases due to the staphylococcus pyogenes albus are the most mild and run a less acute course, while the results of operation are better. Those due to the streptococcus pyogenes vary from virulent to fairly mild.

The method by which the micro-organism gains access to the system is not always discoverable. Frequently, if the body be examined narrowly, we find the mark of a recent poisoned wound, and may even discover inflammation of the lymphatics and enlargement of the glands, but often there is no apparent lesion. Still, with decayed teeth, enlarged tonsils, nasal catarrh, and the ubiquity of these micro-organisms, there is no great difficulty in accounting for their entrance.

Predisposing causes are bad hygienic conditions, a sudden chill, bad health due to a recent attack of measles, scarlatina, or whooping-cough, but we often find that this disease attacks those who are apparently strong and in good health, and in some of these it may run its most rapid course.

This disease may attack any of the long bones. The femur, the tibia, the humerus, the ulna, the radius, the clavicle, and the phalanges of the hand and foot are alike susceptible. The most frequently affected is the femur, in either its lower or upper end; the lower end of the tibia comes next, while the humerus makes a good third.

After infancy, boys are more frequently attacked than girls, probably on account of their being more liable to injury. My experience as to the age at which this disease most frequently occurs is somewhat different from other writers, it being most

frequent, in my experience, about the age of three. Twice during the present year I have operated on children of three weeks old where a septic umbilical cord gave entrance to the germs, while the oldest case that I have met with was seventeen years of age.

The symptoms to be observed generally are as follows:—

We find the history of an injury, such as a fall or a twist; the child becomes fretful, listless, and cries when it is moved; the pulse is very rapid and the temperature high. As the case progresses, the face of the child becomes of a dirty earthy hue, almost pathognomonic; convulsions are common, and often delirium is present. During the first few hours a physical examination may reveal nothing more about the joint that is affected than extreme tenderness, want of mobility, and a slight increase of heat. Soon however, swelling is noticed, and in some cases, with an increase of the swelling, there is remission of the constitutional symptoms. The temperature falls a little, the child becomes less fretful, and the limb, though swollen, is not so tender when touched.

In other cases this swelling passes up or down the limb; the whole thigh, forearm, arm, or leg becomes red, tense, and shiny, and the constitutional symptoms suffer no diminution. In cases *where a remission* of the symptoms has occurred, it means that the pus has found vent from the interior of the bone, and on account of the diminished tension the pain has also become less. In those cases where *there is no remission* of the symptoms, and where the swelling has continued to increase, we find that the pus has run under the periosteum, stripping it from the bone, and causing, with an associated osteomyelitis, continued intense pain. If the disease is of the most virulent type, the constitutional symptoms will be severe from the very first, temperature running from 103° to 105° F. The pulse will be rapid and small, delirium will quickly supervene, and, even before there is almost any swelling to be made out, the child may die of toxic poisoning. In cases less severe, if left alone, death may result from septic pneumonia, pleurisy, or pericarditis, or from exhaustion.

And here I may be permitted to remark how seldom this disease is diagnosed in its early stages. In infants of under a year, often the symptoms are regarded as due to gastric

disorders or to teething; and I would urge that, in every case of severe illness in a child, the limbs be moved and handled in order to exclude the possibility of this disease being present.

Where the child is older, even where a painful joint has been discovered, the condition, alas! is too often set down to acute rheumatism, and valuable time is wasted, the limb rendered useless, and even the life of the child sacrificed, before the medical man realises the nature of the complaint he is dealing with. Indeed, I make bold to say that in no disease that I know of are mistakes so common, and in few is the result of the mistake or delay more serious. Case after case is admitted to the Hospital, and the tale is almost invariably the same—"It was not diagnosed." It is with no feeling of self-complacency that I make this assertion so derogatory to the diagnostic acuteness of my medical brethren, for, before I conclude, I shall give proof that, in dealing with this disease, I have had ample grounds for clothing myself in sackcloth and ashes.

Differential Diagnosis.

Acute articular rheumatism and erysipelas are the diseases for which this disease is most frequently mistaken.

With the history of a recent injury one might mistake the swelling for erysipelas associated with the injury; but there is seldom that redness we find in erysipelas, and never the clear, well defined margin between the inflamed and the healthy skin. In addition, deep pressure would show that the pain was in the bone and not superficial.

Acute articular rheumatism is a frequent but bad diagnosis, and is excusable only when, as is rare, more than one bone is affected. The disease, except at the head of the femur, is not a joint disease, and although the tissue surrounding the joint may be inflamed, we should remember that there is no monarthritis in a child. Acute monarthritis, due to gonorrhœa, we do meet with in the adult, but in a child, excluding the presence of gonorrhœa, if we find an inflamed joint with severe pain associated with grave constitutional symptoms, we may safely conclude that it is acute septic diaphysitis. Certainly we may be sure it is not articular rheumatism.

Treatment.

With such pathology there can be but one form of treatment for this disease, viz. immediate incision. No time is to be lost, for a few hours may make all the difference between success and failure. Even although one be in doubt (and it does require nerve to incise into the hip-joint where there are no physical signs of pus) it is better to incise and not find pus, than to delay and sacrifice the limb and possibly the patient. I have never yet cut down on the bone of a suspected case without finding pus, but I have several times delayed operation with injurious results.

As a preliminary, the limb has to be cleansed and disinfected as thoroughly as for an aseptic operation. The incision has to be made down on the epiphysis at the end of the bone. *If pus be found*, a search may be made for the opening in the bone by which it has come to the surface, and this opening, if found, may be enlarged; if no opening is found, one must be made, and the bone cavity carefully washed out with some sterile or antiseptic solution. *If the pus be not found*, then the surgeon should cut into the bone over the site of the epiphyseal cartilage, using a longitudinal incision parallel to the long axis of the bone. The pus having been found, copious irrigation should be employed, and, if the quantity of pus be not large, it may be wise to risk treating it as an aseptic wound. This is specially desirable in an early case of disease of the neck of the femur. Should the pus have passed below the periosteum and filled the surrounding tissues, it is better, after washing out and irrigating well, to insert drainage tubes, dressing aseptically. As a result of incision and evacuation of the pus, the temperature falls, the pulse becomes slower, the pain passes away, and, with the limb fastened on a splint, the patient enjoys comparative comfort. Of course the usual constitutional treatment will be given. Iron, strychnia, and good food will help to complete the desired cure.

If the constitutional symptoms are severe, with great denudation of the periosteum, amputation should be performed at once. Cases run their course so quickly, there is so little hope of the limb being useful, and the risk of secondary infection is so great, that it is better to sacrifice the limb than to risk

those secondary infections and the resulting complications. In cases where the denudation of the periosteum is great, but where it does not involve all the circumference of the bone, if the constitutional symptoms are not severe, drainage may be employed at various points, and, leaving the wound open, we may trust that in time the necrosed bone will be exfoliated and fresh bone formed by the remaining periosteum.

While a certain percentage of cases recover by incision, the bulk of them require further operation. As pieces of necrosed bone are thrown off from time to time or become loose, an anæsthetic will be required to allow of sequestrotomy and clearing out of the medulla. After this has been done, the cavity should be packed with worsted threads which have been steeped in iodoform. But while the bulk of cases recover after a lapse of several months, some few cases will require amputation in order to save the patient from dying from exhaustion and waxy disease.

Not unfrequently we find more than one limb involved, and in such cases the prognosis is less favourable. Where the disease is so extensive, it may be wise to sacrifice one limb in order to give the child a chance of combating the affection of the others. Still further, even although we may effect a present cure, if the cartilage has been greatly affected, as the growth of the child proceeds the affected limb will be shorter and of less use than the other. But it is wonderful how well many of these cases do, and how a useful right arm may be gained even where it has been necessary to remove two inches of bone from the upper end of the humerus.

It is impossible in such a paper as this to give an account of many cases of this disease, and I shall therefore give briefly typical examples of the various forms I have described. First let me give you an example of how rapidly fatal it may be.

W. A., aged seven, a boy in good health, attending school, on a Tuesday at mid-day received a kick on the leg from a schoolfellow. Through the night he became feverish, complaining of pain over the left ankle. During the next day he rapidly became worse; and when I saw him on Wednesday night about twelve o'clock, he was delirious, pulse 150, temperature 104°. It was only after careful inquiry that I

got the history of the injury and his complaint of pain, and a most careful examination showed only a slight swelling over the external malleolus of the left leg. The symptoms were so acute that I was inclined to suspect meningitis, and delayed removal of the child to the Hospital. On calling next morning I found the child had died through the night, and subsequently, on incising over the malleolus, I found denudation of the bone with escape of serous fluid, which had not yet become pus, though pus was found in the bone. Manifestly, in such a case, immediate amputation was the only treatment.

In January 1894 I was called to see W. R., a child of six months. It had been fretful for a few days; there was vomiting, bowels were loose, offensive, and the motions green and slimy. The day previous to my visit it had become rapidly worse, crying constantly, and evidently very ill. When I saw the child its face was pale, pulse 130, and temperature 103°, and its cry was a pitiable whine. The abdomen was distended and tender, but, so far as my examination went, all else seemed normal.

I regarded it as a case of gastro-intestinal catarrh, and prescribed accordingly.

Although the bowels improved, the child got worse. The tongue became dry and brown, sordes appeared on the teeth, and the face became of a dirty earthy tint.

After a day or two the mother mentioned that the child could not bear to be lifted. On stripping the infant, a swelling was found over the right hip-joint, and the limb hung flaccid. The diagnosis was quite plain; and, on removal of the child to the Hospital, I had the mortification of finding the head of the femur lying loose in the acetabulum, and the hip-joint full of pus. As amputation was refused, the child lingered for a while, developed pyæmia, and died.

The fault was entirely mine, my examination was not complete. Since then I have made it a rule, after examining the chest and the abdomen of any infant, to take hold of both elbows and rotate the arms; then, seizing hold of the knees, to do the same to the legs.

I am glad to say that this was my last serious mistake in recognising this disease, and I would venture to impress upon

those who have to treat children the importance of following the method of examination as described, to ensure that the limbs are sound and healthy.

As an example of how well cases may do if but treated early, let me relate the following:—

A child of two years had suddenly become ill, screaming loudly and continuously, especially on the slightest movement. It was noticed that the right leg could not be moved, and the medical man who was summoned ordered the child's removal to the Hospital. I saw it six hours after its illness commenced. Temperature was 102.5°, pulse 120. There was marked tenderness over the right hip-joint, but no swelling, and no fluctuation. I regarded the case as acute diaphysitis of the neck of the femur. I opened the joint by the anterior incision, and on reaching the neck of the femur there appeared nothing abnormal, but on drilling in on the epiphyseal cartilage a small quantity of pus escaped. The joint was washed out with a warm solution, a drainage tube was inserted, and the wound stitched up. The temperature and pulse fell, the child became quite comfortable and free from pain. Irrigation was done for a day or two, the tube was removed, the wound healed by first intention, and, I am glad to say, the child has a limb as healthy as though it had not suffered from this disease.

I have had another case of like nature in my own practice, and with the same satisfactory result. At present there is a sub-acute case in the Hospital, where we expect a like satisfactory result.

F. J. P., a strong, healthy boy of twelve, was on the 12th July 1904 struck on the left wrist with a brush by another boy, and had his arm twisted violently. He passed a restless night, and in the morning the forearm and wrist were swollen, red, and painful on movement. The medical man who saw him on the 14th found the pulse rapid and temperature 101°, the arm stiff and swollen. He was admitted to the Hospital on the 15th, and the whole forearm and elbow-joint were swollen, brawny and hot, and a large part of the skin on the outside was red, but there was no evident margin. Tempera ture was 104°, pulse 132.

I operated in the evening, and found the upper third of the radius denuded of periosteum. The bone was opened and pus was found. Flushing was done and drainage tubes were inserted. He had a restless night, was delirious, and at 9 A.M. the temperature was 104°, pulse 154. There was subsultus tendinum, and picking of the bed-clothes. At noon, I amputated through the upper arm, and at 6.30 the same night the pulse was 115, the temperature normal, and the patient much better. I found the whole of the ulna and upper part of the radius were denuded of periosteum. He did well till the 21st, when the temperature rose to 102°, pulse 116, and he complained of pain over the left internal malleolus, which was tender on pressure, and the lower part of the leg somewhat red and swollen. On the 22nd I incised over the lower end of the left tibia, and found the bone stripped of periosteum, and on making an incision down to the epiphyseal cartilage about one drachm of pus was got. It was washed out, drained, and it healed somewhat slowly. Some time after he returned to the Hospital to have some pieces of necrosed bone removed from the lower wound, but when last seen the leg had healed satisfactorily and was quite sound. The arm also healed well.

Another case with a history almost similar, but where it was the tibia that was denuded of periosteum, and where the constitutional symptoms were also similarly severe, required amputation. The micro-organism in both cases was the staphylococcus pyogenes aureus.

O. W., nine years, had been ailing with a swelling in the right shoulder for five weeks.

When I saw him there was the history of severe pain, swelling in the right shoulder, and delirium. After a few days the swelling increased, but the pain became less and the delirium passed away. Although the patient seemed somewhat better, the arm could not be moved. I operated, and, on cutting down on the head of the humerus, found it necrosed and the surrounding tissue full of pus and blood-stained debris. I removed two inches of the head of the bone, and, after a lapse of twelve months, the boy has a useful right arm, strong and serviceable.

In this case it was when the pus found vent that the pain became less and the constitutional symptoms milder. The micro-organism found was streptococcus pyogenes.

This list of cases might be greatly enlarged by giving notes of a case where the head of the radius had been burst off and was lying loose in the joint; and another where the lower end of the femur was affected and the pus found its way to the popliteal space by a small opening in the intercondylar notch (complete recovery resulted). Both were due to streptococcus pyogenes. But to add to the list would be a tax on your forbearance. Sufficient to say that any of the long bones may be attacked, and the disease in any of them may be so severe as to cause the death of the patient. The phalanges of the hands and feet are often affected, and I hold the opinion that some of those so-called deep-seated whitlows are, in young people, not whitlows, but cases of acute diaphysitis. Enough has been said to show the seriousness of the disease, the liability to errors in diagnosis, and the need of prompt interference at the earliest possible period.

Whether the view I have given of the pathology be correct or not, it is a view beginning to be held by those who have most experience in treating these acute bone diseases, and it has the merit of explaining, in a simple manner, all the clinical and pathological conditions found, and of bringing together the different forms of bone disease in children, and showing them to be varying manifestations of the same primary form, *i.e.* acute septic diaphysitis. To sum up briefly in two propositions, I consider :—

First, that in the long bones of children, acute diaphysitis is the primary disease, and that acute septic arthritis, acute periostitis, acute osteomyelitis, acute epiphysitis, and acute necrosis are but results and manifestations of the original pathological condition, and that these different manifestations are due partly to causes not yet understood, but partly to evident enough causes, such as the virulence and site of the attacking micro-organism, the varying amount of ossification of both epiphysis and diaphysis, and to the relation of the epiphyseal cartilage to the capsule of the joint.

Second, that when, at the end of any of the long bones in

a child, we find great pain and tenderness on pressure, associated with severe constitutional symptoms, it is our duty, even before there be visible swelling, to regard it as a case of acute septic diaphysitis, and to operate immediately.

My thanks are due to Dr Dean, formerly of Aberdeen, now of the Lister Institute of Preventive Medicine, and to Dr G. M. Duncan, Aberdeen, for the examination and identification of the organisms.

ON BIER'S TREATMENT OF ACUTE INFLAMMATION BY PASSIVE CONGESTION[1]

By CHARLES W. CATHCART, F.R.C.S.

As the outcome of Lister's antiseptic method, surgeons everywhere now recognise that acute inflammation and suppuration in operation wounds, made through unbroken skin, are complications which need not arise, and for which they and their assistants are responsible. But although Lister's immortal method has prevented the onset of an incalculable amount of suppurative disease, with all that is thereby entailed, the method has done, and can do, comparatively little to cure suppurative disease when it is actually in progress. So long as the pyogenic organisms are outside the body they can be dealt with effectively by many well-known means. When, however, they have become lodged in the body, they are safe from the weapons which could have destroyed them when outside. This is partly because they are then protected from the attack of antiseptic lotions by the tissues and fluids in which they lurk, partly because the tissues are generally more liable to be hurt by the antiseptic measures than the organisms are. Thus it is that the surgeon is still at a great disadvantage when he has to deal with such cases as a whitlow extending into the tendon sheaths, an acute suppurative osteo-myelitis, a large boil or carbuncle, suppuration in a joint from accidental wound or otherwise, or with any form of suppurating wound, whether contaminated by traumatism, or as the result of failure of his own antiseptic precautions. In all such cases the agents which most effectively attack the invading organisms are the cells and fluids of the invaded part, and that surgeon succeeds best

[1] Read before the Med. Chir. Soc. of Edinburgh, Feb. 1906.

who best aids and abets these weapons of nature, whether with or without the addition of antiseptic agents technically so called.

But while the wisdom of aiding natural methods of cure for suppurative inflammation is well recognised, there has long been much uncertainty as to what these natural agents really are, and as to the way in which they are brought into play. Recent discoveries have indeed thrown some light on this subject, but the knowledge we now have is still far from being definite and clear. Our fathers in the profession considered inflammation hurtful, a process which must be combated, as the word antiphlogistic clearly shows. Bier, on the other hand, looks upon inflammation as a curative agent which ought to be encouraged and utilised rather than opposed and thwarted. Whether Bier's view or the old one is the more correct we need not stop to discuss just now. This at least is certain that, based upon his theory of inflammation, Bier has devised a practical method of treating suppurative diseases which is astonishingly successful, and no less simple than effective. By the use of a piece of elastic bandage properly applied—as I hope to show—the surgeon is enabled to do nearly as much to cure septic inflammation of the extremities as antiseptic and aseptic methods have done to prevent them. Prevention of course is, and will always remain, better than cure; but, in many kinds of suppurative disease, prevention is impossible, and when this is so a method of treatment which cuts these diseases short and robs them of their terrors cannot fail to be of inestimable benefit to mankind. For this reason I am glad of the opportunity of bringing under the notice of the Medico-Chirurgical Society a method which is comparatively unknown, but which I am certain will before long be recognised as one of the standard methods of treatment in the hands of the profession.

As the time is limited I shall not attempt to give an historical account of what led Bier to adopt this method of treatment. It is sufficient for the present purpose to say that he has employed passive congestion for acute suppurative inflammation since 1893, although more extensively in the latter part of that time.

The method he adopts as a general rule is as follows:—Suppose the case to be one of acute whitlow, extending along a tendon sheath to the wrist, and producing redness and

swelling of the hand. A piece of Martin's rubber bandage would be bound round the upper arm. If the foot were affected the bandage would be applied to the thigh, *i.e.* always a considerable distance above the seat of mischief. The bandage is put on sufficiently tight to hinder definitely the venous return, while it only slightly diminishes the arterial flow. The pressure in acute cases is very light. Any accessible pulse below the bandage should be easily felt, and the limb should be warm. One great test of the proper degree of tightness is the relief of pain. Sometimes a good deal of patience is required before the exact degree of tightness is attained which diminishes pain. When this has been found the rapid relief of pain is very striking, and generally astonishes the patient's friends as much as it gratifies the patient. In a few cases, however, and these chiefly of gonorrhœal origin, pain may be increased at first, although it afterwards diminishes. Another test of the proper application of the bandage is the objective effect upon the limb. After a few minutes the whole limb begins to swell, and the "fiery red" colour, formerly limited, say, to the hand and wrist, will now extend right up to the elastic bandage, while the skin will also feel warmer. When the œdema is well established, serum escapes freely from any wound which may exist, and an appropriate amount of loose absorbent dressing will be required to soak it up. There must, however, be nothing tight round the limb below the bandage. Severe cases should be treated in bed. In bad cases the passive congestion is kept up for 22 out of the 24 hours, and this may be diminished by degrees to from 8-10 hours. The following points, however, have also to be attended to:—

The position of the bandage should be changed after about 10 hours in one place. The bandage over an œdematous limb may have to be tightened as the œdema is dispersed.

In parts of the body, such as the shoulder, where there is no room to vary the position of the bandage, Bier recommends that congestion should not be kept up for longer than 8-10 hours, and that the part compressed by the bandage should be well washed with spirit at each interval.

In the intervals of relaxation the limb should be raised so as to favour absorption of the effused lymph.

The progress of the case can be gauged by the patient's general condition and by the local appearances and symptoms. As a general rule the patient is not only soon eased of pain, but feels brighter and better. The pulse improves and the temperature drops. This reduction in the temperature occurs very quickly when the cause of the raised temperature is merely the absorption of poison from the inflamed area. A rise of temperature may then be observed during the intervals in which the bandage is relaxed. This of course is due to the setting free again of poison retained along with the serum. In proportion, however, as the treatment is successful in combating the suppurative inflammation, such rises of temperature diminish, since there is less poison generated in the local micro-organismal factory. On the other hand, when the cause of elevated temperature is septicæmia or pyæmia, passive congestion can only influence the temperature indirectly by improving the condition of the focus from which the circulating blood has been contaminated; and such influence may, for a time at least, be inappreciable.

At the affected place, the more acute the inflammation, the more easy it is to cause œdema and diffuse redness by the elastic compression. As the inflamed area improves by the use of the bandage, it responds less and less to constriction on the limb, until the reaction is almost as little as it would be in health. The surgeon, however, does not require to keep up the passive congestion as long as this. After convalescence has fairly set in, progress seems to go on faster without artificial aid. This of course is true of many other remedies besides the one we are now speaking of. Any pus which may form should be let out, but the incision or incisions need not be so extensive as would have been necessary without passive congestion. Free incisions are only required when the circulation of the part is seriously impaired. Should blisters appear, either the bandage is too tight or suppuration has occurred which must be relieved.

Bier insists upon great care and watchfulness, especially in the first day or two. If the bandage is too slack, it does no good; if too tight, it will do harm. Medical men who have not yet gained confidence in the method are advised to begin with the milder cases, such as (1) all quite recent acute

inflammations; (2) subacute and less severe inflammatory affections, whether recent or not; (3) gonorrhœal, pyæmic, and acutely suppurating joints, before the tendon sheaths and bones have become involved. After serious complications have arisen the cases are more difficult to treat, and the results, which are not likely to be quite satisfactory at the best, may be put down to the passive congestion method, and not to the damage done before it was begun. Still less should anyone who is not familiar with the method and convinced of its value employ it in dangerous cases. In spite of its use, amputation is often necessary in such cases, and death may follow. An undeserved discredit might then be thrown upon the method, which would prevent its being used in cases where its value would be unmistakable. In general practice, Bier advises that this treatment should only be employed by medical men who have had experience in surgery, and by them only when they are able to keep the patients under close observation.

In contrasting the use of passive congestion for tuberculosis and for acute inflammation, Bier points out that in tuberculosis the congestion is now only kept up for one or two hours daily, and that cyanosis but no œdema results; while in acute inflammation the congestion is prolonged for the greater part of the 24 hours, and the limbs become fiery red in colour and very œdematous.

In order to give an adequate idea of the scope and value of Bier's method, I shall now quote a few typical cases published by him. Only one case—and that where possible a short one—has been selected out of some of Bier's groups of cases.

Suppression of commencing Suppuration by the Use of Passive Congestion.

On the 4th of February 1904, an almost inoperable scirrhus of the breast was removed from a woman aged 60. The wound suppurated freely and for a long time. On the 8th of April a pyæmic metastasis set in in the left wrist, accompanied by a rigor and rise of temperature to 39.4° C. (103° F.). The joint was very red, swollen, and tender on the surface. Passive congestion was applied at once and maintained for 20 hours each day. The pain subsided rapidly, and by the 11th of April the affection of the joint had completely disappeared; temperature was normal and passive congestion was stopped.

Transformation of Acute into Cold Abscess.

This Bier states to be a rare occurrence, but as a well authenticated instance of such transformation is of considerable pathological interest, I shall quote the following case:—

A boy of 7 was admitted to the Klinik on the 28th of July 1904 on account of a sharp and very painful acute inflammation of the lower part of the right thigh. There was redness and swelling on the whole of the outer side, and at the centre there was distinct fluctuation. A diagnostic puncture showed that this contained thick pus with staphylococci. The abscess was purposely not opened, but simple passive congestion was begun. By the 30th of July the abscess had become cold. All appearance of inflammation had disappeared, and the previously elevated temperature had sunk to the normal. The abscess was, however, of the same size as before, and had caused thinning of the overlying skin. On the 5th of August a thorn 1 cm. long escaped, and through the small opening thus made the pus was pressed out without further opening in the skin. On the 9th of August the boy was dismissed with his thigh quite healed.

In another similar case which Bier narrates, the pyogenic organism was a streptococcus.

Disappearance of Abscesses under Passive Congestion.

A boy of 12 was admitted on the 23rd of July 1904 with a severe carbuncle-like inflammation of the back of the head and neck. The skin over the occipital bone on both sides and down to the middle of the neck was densely infiltrated, and the neighbouring parts were much swollen from œdema, and very tender. In the centre of the hard swelling there was a soft portion about the size of a walnut. This was found by diagnostic puncture to contain thick pus with staphylococci. The patient kept his head rigid and bent backwards, temperature in the axilla only slightly raised, *i.e.* 37.9° C. (100° F.). An elastic bandage was applied to the neck and worn during the day. By the 26th of July the head was freely movable and the affected part free from pain. The acute (*heiss*) inflammation had become cold. A puncture now made into the soft spot revealed only clear serum. The passive congestion was continued, and when the patient was dismissed on the 2nd of August all traces of the inflammation, including the abscess, had disappeared.

In commenting on this case, Bier wishes it to be understood that he has only allowed abscesses to be absorbed under passive congestion in a few cases where the symptoms were otherwise favourable. By so doing he has been able to demonstrate the powerfully curative action of the treatment. In ordinary cases his rule is to open an abscess as soon as the presence of pus has been recognised.

From the pathological standpoint, the absorption of pus, after an acute abscess has been transformed by passive congestion into a cold one, is of much interest. Bier believes that occasionally the same process takes place spontaneously in some cases of appendicitis and in some cases of osteo-myelitis. Moreover, in children, as is well known, non-tuberculous empyemas may become absorbed after one or two tappings, and in general surgical practice it is not uncommon to meet with cold abscesses which had begun by being acute, and which, when opened, contained only pyogenic organisms. These facts, together with Bier's evidence as to what takes place when the natural processes are stimulated by passive congestion, enable us to realise that the spontaneous absorption of pus, due to pyogenic organisms, probably takes place more frequently than we have generally supposed, not merely in the abdominal cavity, but also in other parts of the body.

Behaviour of Suppurating Surfaces under Passive Congestion.

As a general rule the pus becomes at first increased in quantity and thinner by the addition of serum; sometimes it is more plentiful, and yet thick at first, although it soon becomes thin. In five cases Bier notes the development of a bad smell and gas, but otherwise these cases went on well. In a very short time the discharge of pus ceases, sloughing tissue is thrown off, and what is more important, portions of tissue recover which apparently would have died under the ordinary methods of treatment. Moreover, suppuration becomes localised and limited, and the incisions necessary to let it out are less extensive and mutilating than they would otherwise be.

Treatment of Acutely and Subacutely Inflamed Joints by Passive Congestion.

Bier narrates several cases of gonorrhœal joint inflammation treated with great benefit by his method. I shall not quote any of them, however, because one of the cases which I have had the opportunity of testing the method upon was a gonorrhœal one, and our time does not admit of more than one case of each kind. In joints affected acutely or subacutely by rheumatism, great relief to pain is given by passive congestion, but in these cases the affection is fleeting in any case. In all such cases, however, Bier recommends the treatment, and he has had very satisfactory results in two severe cases of joint inflammation in puerperal fever.

Treatment of Acute Suppuration in the Larger Joints.

Besides the application of the passive congestion to these cases, Bier mentions certain other details of treatment which he has arrived at as the result of experience.

From joints in which there is a fistulous opening discharging pus, the pus is made to flow every day by passive movement; but existing openings, however small, are not enlarged and the joints are not drained. An unopened joint containing pus is punctured with a fine needle merely for diagnostic purposes, but is neither opened nor drained; no splints are applied. Reliance is placed entirely on passive congestion. Should the knee be affected the patient is kept in bed; if it be the elbow, the affected arm is supported in a sling when the patient can go about; if he is in bed, the arm is allowed to lie in any position that is comfortable. Discharge is taken up by any kind of loose absorbent dressing. Active and gentle passive movements of the joint are begun as soon as the anæsthetic effects of the passive congestion permit—generally in a few hours. These movements are repeated once a day at first, more frequently afterwards. The combination of early movements with passive congestion has brought about a complete restoration of function, without the slightest restriction in even the most severe cases of suppuration in joints.

The following is a typical case of a joint which had a small open wound :—

A stone-breaker aged 18 was stabbed in the left elbow during a scuffle on the 25th of May 1904. The joint was infected and the patient was admitted on the 11th of June. The left elbow was very much swollen, and was red and œdematous. It was held at nearly a right angle and only about 15° of active and passive movement was possible, and that with pain. Over the radio-humeral joint there was a round opening from which projected a soft mass of granulation tissue about the size of a hazel-nut. On passive movement a quantity of pus flowed from this opening. The pain was so great that it prevented sleeping. Temperature was normal. Passive congestion was begun at once. On the 2nd of July the fistula was closed and the swelling of the joint had subsided. Passive congestion was stopped and the joint treated by passive movement. On the 12th of July he was dismissed with all the movements of the joint free, except a slight inability to extend completely. On the 9th of August the patient reported himself with a completely normal joint. He had resumed his hard work as a stone-breaker without any inconvenience.

In the following case there was no opening into the joint :—

A locksmith, aged 20, was suddenly seized on the 4th of July 1904 with an acute inflammation of the right ankle-joint. The affection, after flitting from one joint to another, finally settled with great severity in the right knee, 6 days before the patient's admission to Klinik on the 27th of July. The right knee-joint measured 6¾ cm. more than the left, and the whole thigh was very œdematous and numerous veins were visible on the surface. The joint, which had been kept on a splint, was extended and exceedingly tender. Anything which shook the bed caused the patient to cry out with pain. No attempt at movement was possible. A diagnostic puncture with a hypodermic syringe revealed pus which contained staphylococci, as shown both by culture and the microscope. Passive congestion was begun at once, and some trouble was necessary before the right amount of congestion could be reached. After this had been attained, improvement went on so rapidly that in four days the pain had almost completely disappeared. After 12 days of the application of passive congestion, the previously elevated temperature had sunk to normal, although there had been another rigor on the 3rd of August. On the 10th of August the patient was able to flex his knee to a right angle. There was still considerable effusion in the joint; but when a specimen was withdrawn with

the hypodermic needle it was found to be of a turbid serous character. After the 10th of August the passive congestion was applied for only 2 hours a day. The patient got up from the 15th of August onwards, and although there was a slight effusion in the joint it soon disappeared. Afterwards he acted as a ward attendant in the Klinik. The suppuration in the knee-joint left no trace behind it.

Treatment of Suppurative Inflammation of Tendon Sheaths.

There are probably no cases in which the passive congestion treatment gives better results than those of whitlow, if they are only seen early enough. On the other hand, if suppuration be allowed to burrow unchecked in the sheaths of the tendons for even a day or two, the vitality of the tendons may be irremediably destroyed. Hence passive congestion, unless applied at once, can only be expected to palliate such cases, not to cure them completely. Even such palliation, however, will often be a great gain, as compared with what might have been the result otherwise.

Bier recommends that pus should be let out as soon as its presence is recognised, by small incisions—numerous if necessary—but without either drainage tubes or packing.

The following is a good example of a severe tendon sheath inflammation nipped in the bud :—

A butcher, aged 43, accidentally tore the skin of the little finger of the left hand on the 2nd of November 1899, making an oblique wound about 2 mm. broad. He took no notice of the injury, and worked on till the 5th of November. The wound then suddenly inflamed, and patient's medical attendant incised the finger three times. As the condition became much worse, the patient was admitted to the Greifswald Klinik on the 11th of November. On the flexor aspect of the second phalanx of the little finger there was an oblique wound in which the tendon was exposed. The whole course of the flexor tendons of the little finger was exceedingly tender to touch as far as the wrist. On stroking along the line of the affected tendons from the wrist towards the wound a dirty watery fluid escaped. The skin over the ulnar portion of the wrist and for 3 cm. above it was red and tender. The joint about the first and second phalanges of the little finger was open There was extensive lymphangitis of the forearm and swelling of the supra-trochlear

lymphatic gland. The patient felt ill and was in great pain. Temperature, 39° C. (102.1° F.). Passive congestion was applied at 11 A.M. on the 11th of November, and considerable trouble was necessary before it could be properly adjusted. When this was attained, the pain rapidly subsided, and the finger, which previously had been very painful and immovable, could be moved voluntarily. At 4 P.M. the elastic bandage was removed, and the pain very soon returned. At 6.45 P.M. there was a rigor. Passive congestion was reapplied; again there was difficulty in attaining the proper degree of congestion, but with the same satisfactory result as before when it was properly applied. At 8.30 P.M. temperature was 38° C. (100.4° F.), and at 10 P.M. it was 38.7° C. (101.6° F.). At 10 P.M. the congestion was removed for a short time, and then reapplied until 4 A.M. When the œdema had partially subsided, it was observed that the swelling and redness of the wrist had disappeared as well as the lymphangitis, and tenderness remained only in the neighbourhood of the flexor tendons of the wrist. On the 12th of November, passive congestion was induced from 9 A.M. to 1 P.M., from 5 to 8.30 P.M.; and from 10 P.M. to 10 A.M. on the 13th November. By that time the affection was practically well, the swelling had gone down, although some tenderness still remained in the old place. The passive congestion was maintained with long intermissions until the 15th November. On the 12th of November the temperature did not rise above 38.6° C. (101.5° F.), on the 14th not above 37.7° C. (99.8° F.), and from the 15th was normal. A few superficial portions of dead tendon were discharged from the wound; afterwards it healed rapidly. The joint, which had suppurated, remained somewhat stiff and creaked on movement, otherwise the functions of the hand were completely restored.

Out of twenty-two cases of suppurative inflammation of tendon sheaths treated by passive congestion, 14 recovered with sound tendons. Of the 8 cases in which there was sloughing of tendons, the mischief had been going on for more than a month in one case, for 14 days in two cases, for 12 days in one case, for 10 days in one case, for 7 days in one case, for 2½ days in one case, while in one case there was no exact history of the onset, as the patient suffered from syringomyelia.

Treatment of Acute Osteo-Myelitis.

The following is an example of how the disease may be cut short when the treatment is begun early :—

A boy, aged 13, was taken ill on the 28th of October, after a

fall, and had a rigor and much pain with severe inflammation in the left leg. On the 30th October the boy was admitted to the Klinik. Temperature 38.8° C. (102° F.), rising in the evening to 39.3° C. (103° F.). He was thin and pale, and the left leg, which was very much swollen and measured 4 cm. more than the right, was reddened and very painful. There was great tenderness, especially at the upper part of the tibia. Passive congestion was begun, and at the end of twenty-four hours all subjective symptoms had disappeared. After four days all objective symptoms had also disappeared. Temperature normal. On the 4th of November the boy was dismissed quite well.

As an example of the value of the treatment in a more severe case we may take the following :—

A boy of 9 was taken ill a week before his admission with severe inflammation of the right leg and knee-joint. On the 22nd of December 1903 he was admitted very ill and with high temperature. The right leg was very much inflamed. At the upper end of the tibia there was an abscess which had been laid open by an incision 6 cm. long, which had exposed the bone. The knee-joint was much swollen and contained pus with staphylococci, when punctured with a hypodermic needle on the 29th of December. On the same day passive congestion was begun, and in a very short time all trouble in the knee subsided. On the 9th of January 1904 an abscess was opened on the outer side of the knee by an incision 3 cm. long. On the 10th, a minute sequestrum was removed from the front of the tibia. As all symptoms of inflammation and fever had subsided, the passive congestion was not applied after the 31st January. The knee was free from fluid and movable, but two fistulous openings remained over the tibia. These were dealt with under anæsthesia on the 2nd of March, and one was found to lead to the surface of the periosteum, and the other to pass by a track lined by granulations through the head of the tibia into the knee-joint. When this sinus was scraped out some loose flakes of cartilage were removed, along with granulation tissue. Movements of the joint caused clear synovial fluid to escape. Passive congestion was induced again, and by the 25th of April the operation wound was completely cicatrised. On the 20th of May the child was discharged. There was no effusion in the knee and the range of joint movements was complete, both active and passive. Some swelling of the capsule itself, however, remained, and there was a considerable degree of lateral movement, for which a supporting apparatus was used.

In all, Bier has treated 14 cases of acute suppurative osteo-

myelitis with passive congestion. Of these, 6 cases healed without necrosis, 5 with very little necrosis, 2 had extensive necrosis, and 1 patient died of pyæmia, although his death had nothing to do with the treatment. This list does not include cases sent to him early and cured by passive congestion.

Apart from the fact that nearly the half of these cases were cured without necrosis, Bier is pleased to be able to record that the sequestra which did form were of small size.

Various Applications of the Method.

The constricting bandage is not only applied to the limbs, but also to the head and neck, and of this an illustration has been given. Thus even acute suppurative inflammation of the middle ear can be brought within the influence of passive congestion.

Bier has found the method of great service in all forms of acute inflammation and suppuration, besides the more serious affections which have been specially mentioned, *i.e.* boils, carbuncles, lymphangitis, erysipelas, acute eczema with itching. What is also interesting is that the benefit is seen in inflammation which is not due to micro-organisms, but to such chemical poisons as that inoculated by a gnat bite, or derived from a gouty diathesis.

When the inflamed area is not on a part to which passive congestion can be applied, Bier uses suction to produce the desired result. His assistant, Dr Klapp, has, at his suggestion, devised various forms of suction apparatus suitable for different parts of the body.

Confirmation of Bier's Results in the Royal Infirmary.

Some may wonder why so much of this paper has been taken up with cases published by Professor Bier. If this is so, the answer is easy. No one has had so much experience of the method as he has. Only by giving details of the cases and of the results of the treatment can an adequate conception of the value of the method be obtained. Moreover, everyone who has read Professor Bier's writings, and especially if they have also had the pleasure of making his acquaintance, as many

of us did last summer, will be satisfied of the absolutely reliable character of all that he records.

At the same time it is important to know if other surgeons have been able to obtain, with his method, results like his. My own experience of the method has been on the whole not only satisfactory, but surprisingly so.

The first case in which passive congestion was adequately applied in Wards 17, 18 for acute suppurative inflammation, was one of suppuration extending from the little finger into the forearm. The patient was admitted to the Royal Infirmary on the 17th of July 1905, and Professor Bier very kindly came over from the Quater-centenary garden party at Heriot's Hospital on the 21st to show me how to apply the bandage.

John Oddie, aged 36, injured his hand on the 6th of July. A small piece of skin was abraded over the first joint of the little finger of the right hand. He paid no attention to it at first. On the 7th the little finger became painful. On the 8th the whole finger became swollen and more painful and the patient came to the out-patient department of the Royal Infirmary. The wound was swabbed with pure carbolic acid and an ichthyol dressing applied to the fourth and fifth fingers. On the 10th, when the hand was being dressed, the skin and nail of the little finger peeled off. An incision was made into the skin over the distal part of the fifth metacarpal bone, and ichthyol reapplied. Swelling and redness spread up the forearm until on the 17th, when the patient was admitted, the little finger was gangrenous and there was suppuration on the radial side of the forearm at the wrist. This was incised, and the arm put into an ichthyol bath. On the 20th an incision was made into the ulnar side of the forearm on account of the suppuration there. On the 21st the arm was put into a corrosive sublimate bath. In the afternoon, arm was taken from the bath and passive congestion applied by Professor Bier about 4 P.M. Patient was comfortable all night. 22nd, arm looking very much better. Skin wrinkled and less red. Temperature and pulse both about 98. Bandage removed 7 to 10 A.M. and reapplied from 1 P.M. to midnight. 23rd, arm improving wonderfully. Temperature normal. Congestion from 2 A.M. to 8 P.M., reapplied at midnight. 28th, wounds now granulating. 3rd August, discharged to Convalescent—little finger separating slowly. The little finger was eventually removed. The hand otherwise recovered with free movement and complete usefulness.

Although in this case improvement had begun before

passive congestion was applied, the ultimate recovery at that time was doubtful. From the time when the passive congestion was applied, the progress was so decided that no further anxiety was felt.

Cellulitis of Hand and Forearm.

Robert R., æt. 40, cowman from Bathgate, was admitted to Ward 18, Royal Infirmary, on the 8th of November 1905, on account of pain and swelling in the right hand and forearm. About a fortnight before admission he had felt some pain in the thumb, which he thought was caused by the prick of a thistle, but he paid very little attention to it until the 5th of November, when it became much worse, and he was unable to sleep for the pain. An incision was made into a swelling on the ball of the thumb and various dressings were applied, but without giving relief. Hot poultices had eased him more than anything else, and by their means he had slept two hours on the night of the 7th, *i.e.* before he came in. On the 8th, when he was admitted, he was haggard and anxious looking; the hand was dark red in colour and much swollen, and the redness and swelling extended irregularly up the forearm to the elbow. He was in great pain and felt very miserable. At 2 P.M. an elastic bandage was applied to the middle of the upper arm, and at 7 P.M. the following note was made. The patient feels "a guid bit easier since it has been pitten on." The pain running up the inner side of the arm into the arm-pit has completely vanished. There is no throbbing in the hand or stounding as before. The fore-finger can be moved a little at the metacarpal joint. (He volunteered this information.) The improvement took place about three hours after the bandage was applied, and since then he has had a couple of hours' sleep and seems refreshed and his expression is not so anxious. There is great œdema of the hand and forearm below the bandage.

9th. The patient said that he "felt like a new man." From this time there was no further anxiety as to the spread of the mischief. A slough about the size of a hazelnut separated from the pulp of the thumb on the 17th November, and an abscess was opened over the palmar aspect of the thumb on the 24th of November. On the 12th of December the patient was discharged with the wounds nearly healed, although there was still some stiffness of the wrist and fingers.

Case of Subacute Inflammation and Ulceration of the Foot.

John D., æt. 44, had suffered for about 3 weeks from an ulcer on the foot near the ball of the great toe, accompanied by

inflammation of the skin of the greater part of the foot. There was an occasional shooting pain, but what the patient most complained of was numbness on the outer side of the foot, extending into the sole. He had been troubled with cramp in both legs. Fearing that there might be some interference with the blood supply, and that there was a risk of moist gangrene supervening, I drained an abscess on the dorsum of the foot and used various antiseptic applications, without inducing passive congestion. As there was little or no improvement, however, I cautiously used the elastic bandage, giving instructions to the House Surgeon to remove the bandage if it seemed to do any harm. Instead of doing harm, however, it did great good, the redness and swelling soon subsided and the ulcer began to heal, and on the 6th of November he was discharged cured.

Case of Gonorrhœal "Rheumatism" of the Knee.

Mrs X., aged 38, was suddenly seized with very severe pain in the left knee about the beginning of October. The pain came on without apparent cause while she was sitting in a friend's house. She had to go home in a car and was carried upstairs on reaching her own house. There was very little rise of temperature or pulse, but the pain was extreme from the first, until I saw her four weeks later. I found that her husband had acquired gonorrhœa from another woman in July, and had had connection with his wife while the discharge was still present. Mrs X. had noticed a vaginal discharge but had paid no heed to it, thinking it was only leucorrhœal. When I first saw the patient she was exhausted from want of sleep and continued pain, and had a careworn, anxious look. She could scarcely bear one to touch the knee, and was in great distress if the bed were shaken or if one walked with a heavy step across the floor. The knee was swollen, but not distended with fluid, and its temperature was not raised. A piece of elastic bandage was applied above the knee with sufficient firmness to produce slight venous obstruction. I had fortunately succeeded in getting the proper degree of passive congestion at the first trial, and in fifteen minutes there was a distinct feeling of relief. From that time she steadily improved, and she is now walking about, gaining strength in the joint, although there is still a good deal of stiffness. I have been afraid of awakening the disease again by forcible movement, so we are trusting to active and passive movements, massage, and hot fomentations. Her own medical attendant has kindly sent me the following account of Mrs X.'s case, which he allows me to publish: "For nearly a month I tried everything I knew to relieve the pain—extension, elevation, fomentations, plain and medicated,

linaments, iodine, etc. Internally, salicylates, potassium bromide, potassium iodide, etc., with, I may say, no alleviation of the pain at all. Night after night I was sent for, and in the long-run had to give morphia, and even this required large doses. I have never met with such an obstinate case, and she was being worn out from want of sleep and constant pain.

"Within a few hours—actually in the first hour—after putting on the elastic bandage, she felt eased, and the pain very soon left her altogether, and has not returned. It acted like a charm and gave relief at once, as well to the patient as to me."

Case of Gummata of Tibia. Considerable Wearing Pain.

Christina P., aged 13, was admitted to Ward 17, Royal Infirmary, on the 21st of November 1905, suffering from pain in the left leg below the knee and two ulcers over the tibia. In March she had been kicked on the shin and the leg had become swollen and painful and an abscess had formed. In May this had been opened and the bone scraped. A few weeks after the wound had healed the leg began to swell again, and the wound re-opened and had discharged ever since. Latterly the pain in the leg had been very severe, and made it necessary for her to have something done to relieve it. She had a depressed bridge of the nose, opacity of the cornea from previous keratitis, and syphilitic retinitis. There seemed little doubt that the cause of all these conditions was inherited syphilis, although her father was not aware of having had syphilis. We tried the internal administration of iodide of potassium. Not only was no relief given to the affected leg, but a painful periosteal node developed meanwhile on the other tibia, and the child was kept awake at night by the pain. We now employed the elastic bandage to induce passive congestion in both legs. From that time the pain subsided and the ulcers healed. In about a week the patient was sent home, with directions to continue the elastic bandage at night and report herself if the pain returned. Up to the middle of February we had not heard of her again.

Besides these cases treated in the wards, we have used the method in a number of minor cases, some of early stage of acute inflammation where the pain was relieved and the inflammation checked, some where chronic inflammation was induced to heal.

I have had no cases where any harm was done by the use of passive congestion, but in one or two there has been no

benefit. In one case of septicæmia associated with a form of erysipelas of the arm, the disease was not appreciably affected by the use of passive congestion. In another case, a very indolent form of diffuse inflammation of the side of the face and neck, accompanied by considerable pain passive congestion increased the pain even when very lightly applied. In this case hot poultices relieved the pain and brought about some concentration of the swelling, but the patient is still under treatment, and has not yet either developed suppuration or given any definite sign of resolution.

When we try to answer the question, "How does passive congestion act in acute inflammation?" we find ourselves confronted with a number of interesting problems. So far as the relief of pain is concerned, the effect is so rapidly produced that a mechanical action seems highly probable. Professor Bier suggests that the anæsthetic influence of œdema on the fine nerves is brought into play, and this view seems to answer the requirements of the case. The more active the inflammation, the easier is œdema produced; the more chronic the inflammation, the more difficult is it to obtain that reaction. This may explain why, in the sluggish case just mentioned, hot poultices gave some relief, while passive congestion gave none —in fact rather caused pain.

The lowering of the temperature has already been referred to.

The most important question of all, however, is how are the micro-organisms destroyed and the virulence of their ptomaines neutralised? The germicidal action of the blood serum may explain a great deal, while increased exudation of leucocytes may also be a factor.

In considering the mode of action of passive congestion, it seems worth while to compare with its action the effects of certain other agents or measures upon the same form of inflammation.

The dependent position of an inflamed limb seems always to increase the pain. This may be explained by the action of gravity bringing more blood into the part as well as retarding the exit of both blood and serum from the part.

Ligature of the main artery leading to an inflamed part is often necessary on account of secondary hæmorrhage. During

the American War this procedure was found to benefit the inflammation so much that many limbs were saved by the ligature of the main artery as a treatment of the inflammation, even when there was no secondary hæmorrhage. I have been unable to get access to original papers on the subject, but it is referred to in Cooper's Surgical Dictionary (" Inflammation ").

Mr J. Shaw M'Laren has told me of a case of the kind which much impressed him. He was sent for at night to the Infirmary on account of severe secondary hæmorrhage in a bad case of septic inflammation of the forearm. He ligatured the brachial artery, and from that time the arm improved and a good recovery resulted.

In addition to this measure, most surgeons agree in thinking that a free incision into an acutely inflamed part not only relieves the pain after the sting of the incision has passed off, but checks the inflammation and prevents the development of suppuration.

Moreover the application of cold—so strongly advocated by Esmarch—is generally allowed to be beneficial in certain cases and at an early stage—while at later stages of inflammation, when suppuration is impending, hot applications give most relief to the pain and hasten on suppuration.

In all these different measures which affect acute inflammation—including passive congestion—there may be factors which we are unable to appreciate as yet, but changes in arterial blood pressure seem to be common to most of them. The elastic bandage, a free incision, ligature of the main artery, cold, an elevated position would all diminish the flow in the arteries, while a dependent position would increase it. Certainly warm applications would encourage dilatation of the vessels, but the relief of pain given may be due partly to the serum effused, partly to the drawing off of blood from the affected part by dilatation of vessels near. Warm applications, however, although giving relief to pain and hastening suppuration, often extend the mischief.

As contrasted with these other measuress, passive congestion is immensely superior. It cures the early stages of acute inflammation without allowing suppuration to develop, it checks and limits acute inflammation and suppuration when

already advanced, and it soothes pain like an anæsthetic. In fact it acts better than the best of them for any stage of the affection, and it is simpler than the simplest.

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PERSONAL EXPERIENCES IN THE DETECTION OF HUMAN BLOOD BY MEANS OF THE PRECIPITIN SERUM TEST OF UHLENHUTH

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THE detection of blood stains, either in the fresh or old condition, is by no means difficult, the microscopic, chemical, and spectroscopic characters pertaining to them being sufficiently diagnostic.

The routine method of examining a stain for the presence of blood is first, after making a solution in distilled water or in normal saline solution, to test it with tincture of guaiacum and ozonic ether, either in the test tube or on the microscopic slide. Then the character of the corpuscular elements is determined by the microscope. It may be necessary to tease a small portion of the stained fabric on the slide and examine at once. In the case of blood which has been thoroughly dried, the measurement of the corpuscles is of little value as, owing to their irregular expansion, one would not dare to affirm conclusively from what animal the blood had come. An oval shape or the presence of a nucleus in each corpuscle would of course allow of a differentiation from mammalian blood.

The test by the formation of hæmin crystals would next be tried, and lastly the spectroscopic appearance of the solution would be investigated, the absorption bands due to oxyhæmoglobin, reduced hæmoglobin, methæmoglobin, hæmatin, etc., allowing of easy recognition.

The above methods, however, only allow of the recognition of blood as such, but not of its differentiation as to origin. The precipitin test as devised by Professor Uhlenhuth affords the only means by which one can determine from what animal the blood has come. The reagent in this case is a specific serum which has to be manufactured for the determination of each particular blood. In brief, the method of manufacture is as follows: Suppose we wish to obtain a serum which will give a precipitate with human blood alone. Into the peritoneal cavity of a rabbit from 10 to 20 c.c. of human blood, or the same after defibrination, or even human blood serum, is injected. This is repeated at intervals of four or five days. Gradually the serum of this rabbit's blood increases in precipitating activity, until at the end of the second or third week it has reached a maximum. The animal is then killed and its blood allowed to flow into a sterile vessel in which it coagulates. From 30 to 40 c.c. of active serum may be obtained from each rabbit.

The test is performed in the following way. The colouring matter from the stain (supposed to be human blood) having been dissolved in a few drops of water, is diluted with normal saline solution in the proportion of 1-100 or even 1-1000. Two c.c. of this are placed in a very narrow test tube, and by means of a fine pipette (easily made from an ordinary vaccine tube) a little of the prepared serum from the rabbit is allowed to form a layer beneath the diluted human blood. At the junction of these fluids a white line of opacity forms within a few seconds if the suspected fluid be human blood, but not if the blood be from any other animal. The opaque line increases in density and soon afterwards the precipitate falls to the bottom of the tube. This action is usually completed within ten minutes. With the blood of certain apes this reaction also takes place, but it is neither so rapid nor so distinct as with human blood. This is a fallacy which in our own country would hardly ever occur, and even if it did, the error could be eliminated by injecting human blood into a member of the particular variety of ape and then employing the serum of its blood as a precipitin test for human blood.

As regards my own experience with this serum, I made numerous experiments with human blood in all degrees of

dilution, even up to the proportion of 1-1000 and beyond, and all gave a precipitin reaction with the prepared serum. Even in cases where the blood had been kept until putrefaction had set in, the filtered fluid gave a marked reaction with the specific serum.

In the case of stains on articles of clothing or on instruments, solutions were made with normal saline solution and carefully filtered. I examined numerous stains of very varying

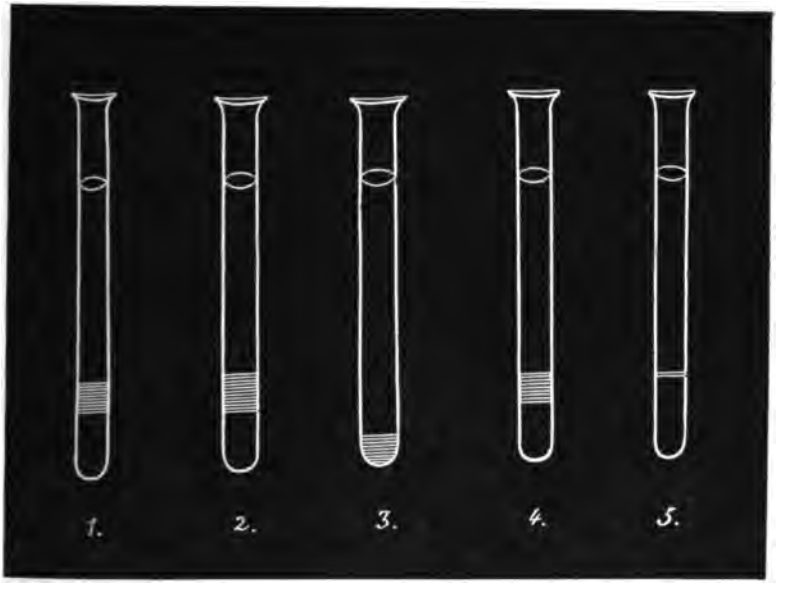

FIG. 1. Reaction with solution from a stain 4 weeks old, after 5 seconds.
,, 2. The same after 12 seconds.
,, 3. The same after 30 minutes.
,, 4. Reaction with stain 9 years old, after 10 minutes.
,, 5. No reaction with blood of ox.

ages. Those which were from one to twenty-four weeks old gave a rapid and marked reaction; while in those which had been kept for several years the precipitate formed more slowly, and though quite distinctive, was not so marked as in the case of more recent stains. The oldest stain which was examined was nine years old, and the figure in the illustration shows the appearance at the end of ten minutes.

The blood of other animals which might most easily be confounded with human blood, as the ox, sheep, or pig, gave

neither in the fresh condition nor as solution from old stains any reaction whatever.

In medico-legal work, all that we would be required to determine would be whether the blood was from a human being or not. Uhlenhuth's test is the only one which up till the present furnishes us with a positive answer to this question.

If the blood were not of human origin, it might be a very difficult matter to tell from what animal it had come, the range is so wide. If the question were narrowed down to whether (for example) it was from a horse, the answer would be easy. We would prepare a rabbit by injecting it with horse's blood, and so obtain a serum having a precipitating action on the blood of the horse alone. In the same way a positive or negative answer could be given in any stated case.

Clinical Records

LABOUR COMPLICATED WITH CARCINOMA OF THE UTERUS

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MALIGNANT disease of the cervix uteri, as a complication of pregnancy and labour, is a subject of much importance, because it involves the ethical consideration of the relative value of the maternal and fœtal life; and also because of the diversity of opinion which exists as to the best line of treatment to be followed. Its supposed rarity is partly accounted for by the fact—first pointed out by Herman—that fully 40 per cent. of the cases terminate in early abortion. Although few cases come under individual observers, the literature on the subject is a large one, as shown by the important statistical works of Herman, Noble, Bar, and Sarwey.

In deciding on the line of treatment during the early months of pregnancy, it has to be determined whether the disease is sufficiently limited to permit of its complete removal, or so advanced as to render total eradication impossible. In the former case there is a fair consensus of agreement that the shorter time pregnancy and cancer are allowed to run together the better for the patient, and that the uterus should be removed

as soon as possible, without any consideration of the fœtus. French authorities, however, have lately expressed the opinion that, in early cases of carcinoma of the uterus in pregnancy, the outlook for the mother, even with immediate operation, is so unfavourable that the interests of the child should alone be considered, by allowing it to be left in the uterus until at least the seventh month is reached. Those authorities do not seem to put sufficient importance upon the fact that the child's life is endangered in cases of this complication, as it has been shown that only about 30 per cent. of the children allowed to go on to full time survive their birth.

During the first six months of pregnancy with an operable cancer of the cervix, vaginal hysterectomy should be immediately performed with or without previously emptying the uterus as necessity demands. From the sixth month onwards, however, the problem is more complex, as the fœtus is now approaching the age of viability, and its interests must be considered. If the disease is in a very early stage, it might be justifiable to wait a month for the viability of the fœtus, otherwise the uterus should be extirpated at once, sacrificing the interests of the child to those of the mother. During the last two months the child should be delivered by Cæsarean section, either vaginal or classical, and the uterus immediately removed by abdominal or vaginal hysterectomy.

Although both the vaginal and abdominal operation have still their advocates, a study of recent literature and of results published by Fritsch, Chrobak, and others tends to favour delivery by vaginal Cæsarean section, followed by vaginal hysterectomy, even at full time. When a case is first met with after labour has actually commenced, we have to decide whether the disease is sufficiently limited to give a fair prospect of the case terminating, *per vias naturales*, with ordinary obstetric management, or so far advanced as to make this impossible and render Cæsarean section imperative.

Three cases have recently come under my observation, and are as follows:—

1. Mrs L., 34, was admitted to Hospital complaining of pain in lower part of the back, of two months' duration. She was confined a fortnight before admission, and noticed a hæmorrhagic discharge for a month previous to her confinement. She was in labour 17 hours. No instruments were used, and the child was strong and healthy. She had had eight previous normal confinements, no miscarriages, and her previous health had always been good. On examination the cervix was found hard, nodular, and infiltrated, especially round the anterior lip, which bled copiously on manipulation. Vaginal

hysterectomy was immediately performed, the broad ligaments being secured by ligatures. She made a good recovery, and remained free from any signs of recurrence for two years, when a secondary carcinoma proved fatal.

2. Patient, 34, one of eleven. Her obstetric history was as follows:—First pregnancy, 14 years ago, living child; second, 12 years ago, miscarriage at fifth month; third, 10 years ago, full-time child; fourth, 8 years ago, full-time child; fifth, 7 years ago, full-time child; sixth, 6 years ago, full-time child; seventh, 4 years ago, full-time child; eighth, 2 years ago, 8-month child. Ninth pregnancy terminated three weeks before coming under observation, a full-time, healthy child being born. During the greater part of this last pregnancy she had irregular hæmorrhages dating from the end of the second month. Labour lasted 12 hours, and terminated without any assistance. On examination the whole of the posterior lip, and the greater part of the anterior lip, were surrounded by a friable growth, bleeding copiously on manipulation. Immediate vaginal hysterectomy was performed. Signs of recurrence appeared six months after operation.

3. A patient, 32, first seen when in labour. Obstetric history: First pregnancy ended in miscarriage at sixth month; second, full-time, healthy child; third, full-time, healthy child; fourth, full-time child, still-born. During the last four months of her fourth pregnancy the patient had more or less constant hæmorrhage. Her mother died of cancer at the age of 49. On examination the whole of the posterior and part of the anterior lip of the cervix were surrounded by a collar-like growth, bleeding profusely upon manipulation. The cervix was dilated to the size of a five-shilling piece, and the breech presented. The case terminated, after nine hours' labour, as an ordinary breech case. There was some delay in the birth of the after-coming head, necessitating traction and suprapubic pressure, which probably accounted for the death of a full-time, apparently healthy child. Ten days after labour I performed vaginal hysterectomy, but the patient died eight months later of recurrent cancer; or probably more correctly, of carcinoma incompletely removed by hysterectomy.

The points I should like to note from the experience of those cases are—

1st. That although, in all, both lips of the cervix were affected by the disease, labour terminated *per vias naturales* without any assistance—except in the breech case—after a labour of 17, 12, and 9 hours respectively. It has been stated that labour should not be allowed to take place with this complication present, on account of the danger of septic infection from the necessary

bruising of the friable tissues. The cases I have reported, however, do not bear out this view, and it is possible that a cancerous cervix may participate in the normal softening of pregnancy to a greater extent than is generally believed. This might permit of delivery in cases where Cæsarean section is regarded as the only method available.

2nd. In all the three reported cases the disease was of the adeno-carcinomatous type, and it is possible that this form of malignant growth may permit of dilatation of the cervix more readily than other forms. Gemmel has recently reported a case where the cervix was involved in a hard, scirrhus-like mass, and which showed no signs of dilatation, although the patient had been in labour for 24 hours.

3rd. It is still a disputed question whether the puerperal uterus should be extirpated immediately after delivery, or when involution has taken place. In favour of immediate operation, it is maintained that the puerperal condition accelerates the spread of carcinoma and the production of metastasis as the result of the increased vascularity of the parts and opening up of the lymph channels at this time. Those who advocate waiting till the uterus has become involuted, claim that the patient's condition is more favourable by delaying and that the operation is easier. In the cases I have recorded, hysterectomy was simplified by the laxity of the tissues permitting of freer access to the surrounding parts and easier drawing down of the uterus. Whatever line of treatment is adopted, the results are discouraging. Sarwey, in Veit's "Handbuch der Gynäkologie," tabulates 30 cases of cancer in the last two months of pregnancy. Of these, 11 were treated by Cæsarean section, followed by hysterectomy; in 19, labour terminated normally, and the puerperal uterus was removed by vaginal hysterectomy. Of the 30 cases, there were 23 living mothers and 17 living children. In only 2 cases was the patient alive five years after operation. In both, labour terminated normally, and the uterus was removed by vaginal hysterectomy 3½ weeks and 17 days respectively after delivery.

Partial operations for the removal of the cancerous cervix have been almost abandoned. It must be noted, however, in this connection, that Spencer has recently reported 3 cases delivered normally, and where the disease was removed by high amputation of the cervix in the puerperium. The three patients recovered and were well after 11, 8½, and 8 years.

Wertheim, who strongly advocates extensive abdominal hysterectomy, has recently reported favourable results, including one where the patient remained well 5 years after classical Cæsarean section, followed by abdominal hysterectomy.

In this short paper I have only touched upon the general principles of the subject, and it must be understood that every case of this unfortunate combination is a law to itself, and has to be treated individually.

NOTE ON A CASE OF PREGNANCY IN A BICORNUATE UTERUS

By W. FORDYCE, M.A., M.D., F.R.C.P.,
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THE following case of pregnancy in a malformed uterus is, I think, of sufficient interest to put on record.

The history is briefly as follows:—

I was asked to see the patient, Mrs B., æt. 28, with a view to the removal of a polypus which was projecting from the dilated cervical canal, and which had caused a severe flooding early in February of this year. She had been married for three years. Previous to marriage she had enjoyed perfect health, menstruating rather freely five to six days each month without pain.

Fifteen months after marriage she had a flooding instead of the ordinary monthly period, and this was followed by a three months' abortion. The patient did not know she was pregnant, as she had not ceased to menstruate. She made a good recovery, and continued again to menstruate regularly till February, when she had another severe flooding, which rendered her very anæmic. The bleeding lasted for a week, and several large clots were passed. Menstruation had been normal in the months of January and November, but was rather scanty in December. Her own doctor, on examination, found the uterus enlarged and a polypus protruding from the external os, and, in view of her previous history, thought at first she might be pregnant.

I saw the patient for the first time three days after the bleeding had stopped. She was very anæmic, but then complained only of a thick, yellowish discharge, and from weakness, the result of the severe flooding. On vaginal examination, there was a soft polypoidal mass, about the thickness of a man's thumb, projecting through the external os well into the vagina. The finger could be passed up into the cervical canal, but not high enough up to reach the base of attachment of the polypus. The uterus was lying to the left side and felt slightly enlarged. To the right side, and closely attached to what I supposed to be the normal uterus containing the polypus, was a well-defined

globular swelling, about the size of a closed fist. The tumour was not fluctuating, but of a doughy consistence. I thought at first I had to deal with an extra-uterine gestation, but as there was no history of pain or amenorrhœa, I diagnosed the swelling as a soft fibroid, and that the polypus was probably part of the main tumour mass.

The patient came to Edinburgh to be under my care, and I intended, before removing the polypus, to make a more thorough examination under chloroform than was possible without it. Within thirty-six hours of her arrival, however, she was seized with severe pain in the lower abdomen, and expelled entire a three and a half months' ovum. I feared I must have mistaken the lower end of a partially extended ovum for a polypus, but on vaginal examination after the abortion the polypus was still protruding, though not to the same extent as formerly.

Three days later I decided to remove the polypus, and think I made a mistake in delaying so long, as by this time it was retracted well within the uterus and the external os was closed. Dilatation of the cervix, however, was easy, and I could feel the polypus attached high up in the uterus, which lay to the right side. Its removal was difficult owing to its friability, and was only accomplished piecemeal. I had finished this operation and was palpating the uterus bi-manually, when I found a hard, firm swelling on the right side. On introducing my finger into the cervix, I found it passed up into this body, which was hollow and contained a small piece of placenta, which I removed.

I then realised for the first time the exact nature of the case, and made out very clearly that I was dealing with a uterus bicornis unicollis; that the ovum had been situated in the right horn and formed the boggy swelling in the right side, and that what I had previously thought to be the whole uterus containing the polypus was the left horn.

The bifurcation extended well down to almost the internal os, and ten days after the abortion the two lobes could be quite easily made out. Microscopic examination of the polypus shows it to be composed entirely of decidual tissue. That the general mucous membrane of the non-pregnant horn should form a decidua was to be expected, but I am unaware of a decidual formation having been noted before in a mucous or fibro-mucous polypus of the pregnant uterus. This is one point of interest in the case. The others are: the menstrual history in the patient's two pregnancies, and their premature termination at the third month in each case. Menstruation in cases of bicornuate uteri, as in uterus didelphys, where the division is complete down to the external os, presents several

variations. Menstruation may occur simultaneously from both horns, when the flow is apt to be excessive. Each horn may menstruate regularly every four weeks, but at different periods, and so a form of metrorrhagia results, as in cases recorded by Hill and Lamond Lackie, etc.; or the horns may alternately menstruate, and so the menstrual type be normal. One horn may be so rudimentary as not to have any menstruation, and when both are poorly developed, menstruation is scanty, irregular, and painful.

Should pregnancy occur, one horn may continue to menstruate, as seems to have taken place in the case I have just recorded, though, as I have said, a decidual membrane seems to have formed in the non-pregnant horn, and this being so, menstruation, it was to be expected, would have been in abeyance.

Abortions are frequent, but in the majority of the recorded cases no interference with the course of pregnancy has occurred. In my case the presence of the polypus makes any comparison or deduction as to the cause of the abortion valueless.

Labour, as a rule, is normal. Sometimes, however, the hypertrophied non-pregnant horn has been pushed down into the pelvis, and given rise to serious dystocia. Nagel records three such cases, and in Wöhlein's and Bettman's cases the non-pregnant horn obstructing the pelvic cavity was the cause of the uterus rupturing during labour.

Difficulty and delay may also arise from lack of muscular force on the pregnant horn; failure of the cervix, which is often rudimentary, to dilate; abnormal presentation, which is very frequent; and from the oblique position of the pregnant horn preventing the expulsive forces from being directed in the axis of the pelvis.

Pregnancy in a rudimentary horn, which communicates with the cervix by a very small opening, or does not communicate at all with the rest of the uterus, ends generally in rupture. This class of case, however, is in a different category from the one I have described.

Special Article

THE SANE EPILEPTIC AND THE COLONY SYSTEM

By EDWIN BRAMWELL, M.B., F.R.C.P.,
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INTEREST evoked in a recent article on the Treatment of Epilepsy, in which the Colony System was referred to, suggested to the writer that some reference to this subject might prove acceptable to the readers of the Journal.

The purpose of the present contribution is to expose the unfortunate position of the sane epileptic, to advocate the advantages of the colony system in dealing with individuals of this class, and to indicate the need for a further extension of this system.

The sane epileptic occupies an unenviable position in the struggle for existence which is perhaps unique. Endowed, it may be, with the necessary mental and physical qualifications of the successful wage-getter, the disease from which he suffers frequently precludes him from earning the support necessary for the maintenance of an independent existence.

As is well known, in a considerable proportion of cases epilepsy manifests itself in the first ten years of life or early in the second decade. In consequence, the education of the individual is often interfered with in such a way as to prejudice his chances in the competition of after life. Parents may prefer to keep the child at home, endeavouring thereby to screen his failing from publicity. Again, the occurrence of frequent attacks may necessitate enforced absence from school. Further, the teacher may request the child's removal because of possible ill-effects which the fits may have upon the other children in the class, or it may be on the plea that the undue irritability and passionate tempers exhibited by some of these children necessitate special allowances which are incompatible with the discipline of a mixed class.

Irregular attendance at school, in association, it may be, with defective mental power, often bring the epileptic child into competition with his juniors, a circumstance which tends

to influence unfavourably his morale and self-respect; while, in addition, his failings are apt to expose him to the thoughtless remarks and ridicule of his companions. From these observations the advisability of special schools for the instruction of epileptic children will be appreciated.

Let us now consider the case of the adult epileptic. Leaving out of account those instances in which profound mental alterations or violent post-epileptic states qualify the individual for asylum treatment, it may be said that in the great majority of cases, for the reasons above given, the lower and middle-class epileptic, even granting that he has average mental capabilities, starts life with an education inferior to that of his contemporaries. This in itself constitutes a handicap, although among the labouring classes the individual wage-earning capacity is probably little, if at all, impaired thereby. Difficulties arise when he seeks employment. The fact that he is an epileptic debars him of necessity from following certain occupations, in the pursuit of which the occurrence of a fit might from the special nature of his work be attended with dangerous consequences. Having chosen a trade, the epileptic often finds that work cannot be obtained, his disease precluding him from selection, irrespective of the qualifications which he may possess for the post he seeks. It is possible, indeed, that of recent years the introduction of the Workmen's Compensation Act may have still further diminished the chances of the epileptic who seeks employment. Thus it happens that the epileptic who presents average, and it may be exceptional ability, is often unable to support himself, and has to depend for his subsistence upon his relations or upon private charity, with the prospect of the workhouse constantly before him.

A colony was founded so long ago as 1867 at Bielfield in Germany for the reception of epileptics. In the first instance a farm was acquired upon which a few epileptics were employed. At a later date a large tract of land was purchased and a small township grew up which has gradually increased in size, until at the present time it contains over 2000 individuals, inclusive of the attendant staff. Within recent years a large number of epileptic colonies on similar lines have been founded in America, Germany, Switzerland, England, and elsewhere.

As an illustration of the attention which the question of the provision for epileptics has received in America, we may quote the following clause from the New York State Charities Law of 1896, which applies to the Craig Colony for Epileptics :—

"It shall be the duty of the superintendent of the poor in every county and of the poor authorities of every city to furnish annually to the State Board of Charities a list of all epileptics in their respective jurisdictions so far as the same can be ascertained, with such particulars as to the condition of each epileptic as shall be prescribed by the said State Board. Whenever an epileptic has become a charge for his or her maintenance upon any of the towns or counties in the State, it shall be the duty of all the poor law authorities of such city and the country superintendents of the poor and the supervisors of the county to place such epileptics in the said colony. In providing for the admission of children or on the admission of patients, preference shall always be given to poor and indigent epileptics, or to the epileptic children of poor and indigent epileptics over all others, and preference shall always be given to such as are only able to support themselves in part or to those who have parents who are able only to support themselves in part, over those who are able and who have parents who are able to furnish such support."

In England there are now three epileptic colonies, two of which have been recently opened, in addition to several homes for the reception of epileptic patients.

An account of the foundation and development of the epileptic colony at Chalfont, St Peter, Bucks, which the writer has visited, will serve to illustrate the character, working, and purpose of a typical epileptic colony.

In 1890, a committee composed of "representatives of the British Medical Association and of many charitable institutions, together with poor law guardians and others specially conversant with this question," was appointed to consider and report to the Charity Organisation Society of London "upon the public and charitable provision made for the care and training of feeble-minded, epileptic, deformed, and crippled persons." The need for better provision for epileptics was especially emphasised in this report, in which it was shown that large numbers of epileptics had lost their situations and were unable to obtain employment. The Lord Mayor presided at a public

meeting held at the Mansion House on January 25th, 1893, when it was decided

"that it is expedient to establish in England a colony for epileptics capable of work, on the same lines, as far as circumstances shall render advisable, as the industrial colonies successfully carried on near Bielfield in Germany and elsewhere."

Liberal subscriptions were received, and the National Society for the Employment of Epileptics, of which the Prince of Wales is now President, was instituted.

"The object of the Society is to establish homes where persons suffering from epilepsy, yet capable of some occupation, may enjoy the advantages of regular life with healthy surroundings, and where under the necessary supervision they may, according to their age, sex, and condition, be educated, industrially trained, or suitably employed."

Under the auspices of the Society a farm of 135 acres was purchased at Chalfont, St Peter, Bucks, and the first building, constructed to accommodate 18 colonists in addition to staff officers, was opened in 1894. The aim of the Executive Committee in the management of the colony as set forth in their report being

"to avoid everything which would stamp it with an 'institutional' character. . . . It will be an industrial village, whose inhabitants, though unhappily affected, will be usefully and healthfully occupied, and will as far as possible follow the avocations of ordinary life."

Since its formation the Chalfont colony has been greatly enlarged, the colonists being accommodated in villas, each of which contains from 18 to 24 patients. At the end of the year 1904, 133 male and 64 female epileptics were in residence, while during the year 78 new colonists were admitted and 50 were discharged. A Recreation Hall, a Hospital, and a Convalescent House have been added, and provision is at present being made for the education of epileptic children. The occupations pursued by the inmates of the colony are numerous: outdoor work on the farm, in the orchard or garden, carpentry, basket-making, boot-making, laundry work, etc. Each home is under the charge of a sister, assisted by a male attendant or

female nurse in the male and female cottages respectively. The internal affairs of the colony are under the supervision of a matron. The management of the colony devolves upon the Executive Committee of the Society, while Drs Fletcher Beech, Thomas Buzzard, David Ferrier, Howard Tooth, and Aldren Turner constitute the Honorary Medical Staff.

The Honorary Medical Staff, in their report for the year 1904, remark that

"a cure of epilepsy is not to be expected in more than about 10 per cent. of those affected with this disease. The aim of the institution, therefore, is not so much to attempt a cure by medicinal remedies, as to place the victims of this malady in a condition and state of contentment, so as to preserve as far as possible their mental and physical well-being. We have found that, in the majority of cases, little if any diminution takes place in the number of the fits from year to year; but we do find a material improvement in their physical condition, a feeling of satisfaction in their work and amusements, and a material lessening in the tendency towards dementia."

As important as therapeutic remedies are congenial employment, hygienic modes of life, and suitable amusements, all of which form essential features of the treatment in the Chalfont colony.

The following classes of epileptics are ineligible:—

(*a*) Those who through mental or moral deficiency would be incapable of participating in and benefiting by the mode of life at the colony. (*b*) Those who are liable to outbursts of insanity or dangerous impulses. (*c*) Those who from habitual awkwardness of disposition or excessive irritability of temper would be a source of annoyance to their fellow-colonists. (*d*) Those who through physical disablement or extreme infirmity are unable to engage in any kind of occupation, or are incapable of dressing themselves or of attending to their own personal wants; otherwise, mere physical infirmity does not disqualify. (*e*) Those who suffer from any other disease of such a nature as to render them unsuitable to be inmates of the Homes.

At present, adults are admitted on payment of ten shillings a week. The Poor Law Guardians have power to make the necessary payments for the maintenance of patients at the colony. If, therefore, no other sources of payment are available, the proper course, as a rule, is to apply to the Guardians of the

district in which the applicant resides. It rarely happens that a case, in other respects suitable, has to be excluded because the necessary payments are not forthcoming. Applicants require to undergo a medical examination before admission to the colony, which may be made at the London office of the Society or by a doctor appointed by the Committee.

The colony is dependent for its maintenance upon subscriptions, upon donations which have from time to time been given for particular purposes, and upon the money received from the colonists themselves, in addition to the profit derived from the sale of the farm produce.

In their prospectus for 1905, the National Society for the Employment of Epileptics propound a scheme whereby a contribution of £200 will, in effect, reserve a bed for eligible patients nominated by the donor. A contribution of £4000 will provide and equip a Home for 24 patients, and will give priority of admission to a corresponding number of eligible candidates belonging to any county or other district in which the donor may be specially interested.

The reduced cost of maintenance with the increase in size of the colony is striking. In 1895, when there were 24 colonists, the cost of maintenance of each colonist was £71, 12s. 6d.; while in 1901, with an average of 134 colonists, it was reduced to £32, 4s. 3d. So numerous are the demands for admission, that an applicant may have to remain for a long period before he can be received; indeed, in the case of women, the period of waiting will at present extend to several years.

Space does not permit of detailed reference to other institutions in this country devoted to the care of the sane epileptic. Quite recently a colony has been opened in the neighbourhood of Manchester, the land and buildings for which were provided by the Committee of the David Lewis Trust, while £13,000 has been collected as the nucleus of a general fund. The Asylum Committee of the London County Council have recently opened an epileptic colony at Ewell, in Surrey, for the purpose of accommodating a certain class of epileptics of unsound mind, recognising "that in a certain proportion of those so affected the mental symptoms are remittent, and that between these periods a degree of freedom considerably greater than that afforded in the ordinary asylums can be allowed them."

In addition to the three colonies above mentioned, there are several epileptic homes for the reception of epileptics distributed throughout England.

Up to the present time the care of the sane epileptic has received no attention in Scotland. Through the instigation of the late Mr Quarrier, however, who purchased a farm of 200 acres for the purpose, a colony capable, in the first instance, of accommodating thirty epileptics, will shortly be opened at Bridge of Weir. It is hardly necessary to say that this accommodation is totally inadequate to the demand. The number of epileptics in Scotland can only be roughly gauged by comparison with returns in other countries, in which a special census has been taken. From these returns we are probably correct in stating that the number of epileptics in Scotland figures somewhere between 1 to 2 per 1000 of the population. The writer has notes of forty-six cases of true epilepsy seen within the last three and a half years in the out-patient room of Leith Hospital alone and residing in that town, a figure which would seem to suggest that the malady is at least as common there as elsewhere. Did space permit, it would be possible to cite a number of personal observations to show how difficult it is for an epileptic to obtain a situation and to keep it. That there is an urgent need in Scotland for a colony, such as that which exists at Chalfont, where the epileptic child can receive an education, and where the adult epileptic can follow an employment and no longer constitute a burden on his friends, must be the opinion of all those who are specially brought in contact with this class of case.

Births and Deaths registered in Eight of the Principal Towns of Scotland during February 1906.

DURING the month of February 1906 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth, the births of 3723 living children; of them, 1844 were males, and 1879 females. These births are equivalent to an annual birth-rate of 27.2 per thousand of the estimated population of these towns, a rate which is 1 per thousand less than that for the previous month, but 0.3 more than that for February of last year. The birth-rate for the month was highest in Greenock, 32.6, and lowest in Perth, 20.0. In

Leith it was 29.2; in Glasgow, 29.1; in Paisley, 28.9; in Aberdeen, 26.5; in Dundee, 25.2; and in Edinburgh, 22.3. The total number of births registered was 562 fewer than in January, but 115 more than in February of last year.

Of the total births, 269, or 7.2 per cent., were illegitimate. This illegitimate rate was for the month highest in Perth, 11.3, and lowest in Leith, 3.2. In Dundee it was 8.8; in Edinburgh, 7.7; in Aberdeen, 7.5; in Glasgow, 7.4; in Paisley, 6.2; and in Greenock, 4.0.

Deaths registered in these towns during the month numbered 2516, 1208 being of male persons, and 1308 of female persons. These deaths are 378 fewer than in January, but 66 more than in February of last year. The equivalent death-rate is 18.4, which is 0.7 less than the death-rate for January, but 0.1 more than that for February of last year. The death-rate for the month was highest in Dundee, 23.3, and lowest in Aberdeen, 15.0. In Greenock it was 21.8; in Glasgow, 18.5; in Edinburgh, 17.6; in Perth, 17.0; in Paisley, 16.9; and in Leith, 15.6. In Paisley and Greenock the death-rate was higher than what it was in January, in the remainder of these towns it was less than in that month.

Of the 2516 deaths registered during the month, 780, or 31.0 per cent., were of children of less than five years old, while 744, or 29.6 per cent., were of persons of over sixty. The former are 189 fewer than in January, and 28 fewer than in February of last year; the latter are 31 fewer than in January, but 86 more than in February of last year.

Deaths of children of under one year old numbered 460, a number equivalent to an infantile mortality of 122 per thousand births. This infantile mortality rate is 19 less than in January, and 14 less than in February of last year. The infantile mortality rate for the month was highest in Dundee, 173, and lowest in Leith, 75. In Greenock it was 140; in Aberdeen, 128; in Perth, 127; in Paisley, 126; in Edinburgh, 125; and in Glasgow, 112. In Edinburgh, Aberdeen, Paisley, Greenock, and Perth, this rate was higher than in January, but in Glasgow, Dundee, and Leith, it was lower than in that month.

Deaths from the principal epidemic diseases numbered 196; this is equivalent to an annual death-rate from these causes of 1.4 per thousand. These deaths are 55 fewer than in January, and 1 fewer than in February of last year. The death-rate from these causes is 0.3 less than in January, and 0.1 less than in February of last year. The death-rate from these causes ranged from 2.1 in Dundee and Paisley, to 0 in Perth. In Glasgow it was 1.8; in Edinburgh, 1.0; in Leith, 0.8; in Greenock, 0.6; and in Aberdeen, 0.3.

No deaths were registered during the month as due to smallpox. Deaths from measles numbered 107; these are 21 fewer than in January, but 86 more than in February of last year. Deaths from scarlet fever numbered 10; these are 1 more than in January, and 5 more than in February of last year. Deaths from whooping-cough numbered 27, and were 1 fewer than in January, and 80 fewer than in February of last year. There were 20 deaths from diphtheria; these are 21 fewer than in January, and 2 fewer than in February of last year. There was 1 death from typhus fever, and 13 from enteric fever; the latter are 6 more than in January, but 3 fewer than in February of last year. Deaths from influenza numbered 11, a number 24 less than that of last February.

Deaths from puerperal septic conditions numbered 7; from malignant disease, 122, of which 67 were ascribed to carcinoma, 6 to sarcoma, and 49 to cancer not otherwise defined. Deaths from heart disease numbered 249; from apoplexies, 154; from premature birth debility, 85; and from alcoholism, 7.

Deaths from pneumonia numbered 249, and constituted 9.9 per cent. of the total deaths, while those from bronchitis numbered 265, and constituted 10.5 per cent. of the total. The former were 45 fewer than in January, and 2 fewer than in February last; the latter were 15 more than in January, and 54 more than in February last.

Deaths from tuberculous diseases numbered 334, and constituted 13.3 per cent. of the total deaths. These deaths are 22 more than in January, but 25 less than in February of last year. Of these deaths, 224 were ascribed to phthisis.

Obituary

Thomas Hardie, M.D., F.R.C.P.

ON the 28th February 1906, there passed away in his 69th year, after a long illness, the oldest medical practitioner in the town of Leith. Thomas Hardie graduated as M.D. at the University of Edinburgh in 1858, and thereafter acted as house-surgeon and house-physician in the Old Infirmary under Drs Gillespie and Laycock respectively. One of his fellow-residents with whom he kept up a life-long friendship, and who attended him with unremitting kindness during his last illness, is Dr Joseph Bell.

After a period of study abroad and acting as assistant in Yorkshire, he commenced practice in his native town and soon

gathered a large circle of patients. Naturally of a retiring disposition, he shunned public work outside his own profession, but with the chief medical charity of his town he had a close and honourable connection. For thirty years he acted as one of the visiting physicians of Leith Hospital, at a time when a large part of the Institution was devoted to fever cases, and in his early days he passed through a severe attack of typhus fever himself.

In 1868 he became a Fellow of the Royal College of Physicians of Edinburgh.

He never recovered the severe blow he sustained some four years ago in the loss of his wife, and though the spirit retained much of its old vivacity, his familiar figure aged markedly, and for the last six months he was practically confined to bed. A practitioner of the old school, to whom some of the modern tendencies of medical practice towards commercialism were abhorrent, he was, above all, known by everyone with whom he came in contact as par excellence a gentleman—modest, courtly, polished, and kind—a type of man whose memory will linger long in the hearts of his townsmen and others. H. G. L.

Thomas Duddingston Wilson, M.A., M.B., F.R.C.S.

THE news of the death of Dr Duddingston Wilson on the 8th of March must have come with a shock of pained surprise to his colleagues and friends. On Saturday the 24th of February he attended the monthly dinner of the Cap and Gown Club, and a melancholy interest attaches to the occasion, for a fanciful representation of him adorned the menu and he was subjected to a good deal of banter on the subject. He then seemed to be in his usual health and spirits, and indeed he went about his ordinary work till late on the Monday night following. On the morning of Tuesday, 27th February, he felt too ill to rise, and in the afternoon pneumonia unmistakably declared itself. By the end of the week his case had become hopeless, but he struggled on till the following Thursday, when he quietly passed away at noon.

Thomas Duddingston Wilson was born and bred in Edinburgh, where his father was a doctor in practice in the north side of the city. After attending the Edinburgh Academy, he went to the University, where he followed the Arts Course, graduating M.A., and then passing to the Medical side he got his M.B.

in 1875. After some time spent as resident in Leith Hospital and as assistant to his father, he went to Paris, where he walked the hospitals for a session. Then came a voyage to Australia, and on his return to Edinburgh in 1879 he became a Fellow of the College of Surgeons and took up the duties of medical superintendent at Craiglockhart Hydropathic. A few years later he acquired Dr Jardine's practice and settled in West Newington House, which he has occupied ever since, and where his death took place.

Although somewhat reserved in manner, Duddingston Wilson knew how to win and keep the confidence and respect of his patients, in many of whom his kindness and attention induced a sentiment of affectionate esteem, the intensity of which might well surprise those who only knew him as a casual acquaintance.

Outside his professional work Dr Wilson had few hobbies, but in these he was not without distinction. His holidays were usually spent in the country, where he could indulge his bent for angling, and where he could exercise that keen gift of observation which had endowed him with a knowledge of natural history rarely found in a town-bred man. He was a great admirer of all kinds of field sports and he could hold his own in most indoor games, while in whist particularly he did not often meet his equal.

In politics he was a convinced Conservative, and as chairman of the Unionist Association of the Southern Division and as president of the Newington Unionist Club he did yeoman service for his party. Among his professional brethren, also, he was highly esteemed, so that when the branch of the British Medical Association in the city was divided he was unanimously elected chairman of the South Edinburgh Division.

Though strong and vigorous in appearance, Dr Wilson was never robust, and had suffered more or less from asthma since childhood. For some time past his intimate friends had noticed that he was not quite so well as formerly, but no one anticipated that the end was so near.

On Monday, 12th March, his remains were borne from St Peter's Church and laid at rest in Warriston Cemetery. The crowded attendance at the church, the long funeral cortège, and the large number of wreaths bore eloquent testimony to the widespread feeling of respect and affection in which he was held by all classes of the community. G. M. C.

Meetings of Societies

Edinburgh Medico-Chirurgical Society

THE sixth ordinary meeting was held on March 7—Dr J. O. Affleck, President, in the chair.

Dr Edwin Bramwell showed: (1) a series of outline drawings from six spinal cords illustrating approximate uniformity in the shape of the grey matter at the various segmental levels of the cervical and lumbar enlargements; (2) a series of drawings from spinal cords of two cases of disseminated sclerosis illustrating the distribution of the sclerotic patches; (3) drawings from a third case of disseminated sclerosis for comparison with the last, showing a uniform diminution in bulk of the cord, a condition which has been occasionally described in this disease; (4) photographs of a chronic abscess in the left occipital lobe. There had been two general epileptic fits preceded by visual auræ and right homonymous hemichromatopsia, with partial hemianopsia, pointing to the location of the lesion in life. Operation had been contra-indicated, however, by gangrene of the lung.

Dr T. C. Mackenzie showed a case suggestive of general paralysis in a youth of 19.

Dr Edwin Bramwell showed two cases of non-progressive hemiplegia, in both of which an intracranial tumour, probably tubercular, had been diagnosed. In one of the cases the duration had extended over fifteen years. Dr Bramwell also showed a case of syringomyelia without atrophy, and with scapulo-humeral arthropathy.

Dr R. A. Lundie read notes of a case of temporary blindness due to spasm of the retinal artery. The patient was an old and feeble gentleman, and when first seen was recovering from a sudden attack of temporary complete blindness in one eye. Blood appeared to be entirely absent from a short portion of a branch of the artery corresponding to a part of the visual field which was still blind. Vision soon returned completely and the artery was found to have resumed its normal appearance.

Dr Sym remarked that all such cases were formerly diagnosed as embolism of the retinal artery, but many of the patients were the subject of proliferative endo-arteritis, and cardiac lesions were absent. He thought more cases of spasm might be found if opportunity occurred for examination of the fundus at the time of the occurrence.

Dr James Ritchie mentioned the recurring attacks of aphasia

in old persons as a probably analogous condition, and the President thought that many of the transient cerebral disturbances in such conditions as uræmia might be accounted for by such a vascular spasm as Dr Lundie had described.

Drs H. M. W. Gray and G. M. Duncan communicated a paper on Vaccine Treatment in Surgery.

The main theme of the paper was the treatment of surgical tuberculosis by T.R. Early cases of tubercular adenitis could be easily cured by T.R., and if enlargement persisted after six weeks, caseation was probably present. In caseating cases a gentle scooping became a sufficient operation if T.R. were administered at the same time. Cases of mixed infection were altogether different, and very little benefit occurred until a suitable vaccine against pyogenic organisms was also given. Good results had also been obtained in the tuberculin treatment of joints, peritonitis, psoas abscess, teno-synovitis, and cutaneous lesions, but in genito-urinary diseases it had not been so satisfactory. In joint cases the treatment allowed of early passive movement. Examinations of the opsonic power of the patient's blood should be made by a skilled pathologist, but, as a matter of expediency, it might be safe to give injections at intervals of from ten to fourteen days in surgical cases, as the clinical symptoms were a fairly safe guide.

Besides the more obvious indications, there might be a wide field for vaccine treatment. For example, in large gummata, benefit had followed the use of antistreptococcus and antistaphylococcus vaccines, and these vaccines could be given with advantage before extensive operations in the region of the mouth, not only to prevent septic pneumonia, but to diminish the amount of sloughing. Injections before operation had the effect of cleaning the parts, and cleft palate, fæcal fistula, operations on diabetics or albuminurics were suggested as conditions in which vaccines might be used with advantage.

Mr Stiles remarked that in the course of a large experience of surgical tuberculosis he had seen many surprises, and recovery sometimes occurred in what might seem hopeless cases. He was afraid that if too much faith were placed in vaccine treatment it might be carried out too long, and the ultimate result be worse than if early operation had been performed. He had not had the favourable results which Mr Gray had seen, and regretted that the vaccine treatment was not of much avail in caseating cases, as in them something of the kind was most wanted.

Dr Lawson said that in medical tuberculosis the clinical symptoms were no guide whatsoever to the incidence of the negative phase of immunity. Apart from the question of

expediency, laboratory work was essential if the best results were to be obtained.

Dr J. C. Dunlop read a paper on occupation mortalities in Scotland. He described a new method of tabulation designed to eliminate any over-rating of the accuracy of figures drawn from scanty data.

Professor Littlejohn regretted that Dr Dunlop's figures, the first of their kind calculated for Scotland, suffered from the fact that they could not be accurately compared with existing tables drawn from English mortality data, owing to the difference in method.

Dr Leslie Mackenzie congratulated Dr Dunlop in having filled a distinct gap in Scottish statistical work. Mr Low of the Scottish Equitable Insurance Company welcomed Dr Dunlop's figures, and said that he attached a high value to his neat mathematical method, as nicety of method was the best possible off-set to paucity of statistics.

Edinburgh Obstetrical Society

THE fourth meeting of the 67th session was held on Wednesday, the 14th February—Dr J. W. Ballantyne, the President, in the chair.

The following gentlemen were balloted for and duly elected Fellows of the Society:—James Lawson Russell, M.B., Ch.B.; A. J. M'Kendrick, L.R.C.P. & S.E.; Alexander Scott, M.B., C.M.; A. Simpson, M.B., Ch.B.

The following specimens were exhibited:—

Dr Thomas Wood showed an anencephalic fœtus, there being a clear history of syphilis in the case. The President showed a similar specimen in which also there was a definite history of maternal syphilis.

Dr Haultain showed: (1) A most interesting cystic uterine tumour. (2) A sub-peritoneal cervical fibroid, with which was associated a primary tubercular nodule in the body of the uterus. (3) A tubal gestation. Along with the two last specimens, Dr Haultain showed microscopic preparations demonstrating in the one case the tubercular nodule, and in the other the presence of decidual formation in the tube which was not the seat of the gestation. (4) A polypus removed from a patient who, seven weeks previously, had given birth to twins. On microscopic examination the polypus was found to consist almost entirely of early villi. Dr Haultain advanced the view that the polypus really was a third ovum which had been

blighted in the early stages of development. (5) Tubes exhibiting condition of bi-lateral salpingitis. The interesting feature of the case was that the only symptom the patient had was hæmorrhage of three months' duration. There was no pain, nor was there any rise of temperature.

Dr Barbour showed a uterine fibroid tumour which he had removed along with a large ovarian cyst; both tumours had extensive adhesions to surrounding structures.

Dr Brewis, President from 1903-1905, who had been prevented by illness from giving an address earlier in the session, formally took the chair, and proceeded to present to the Society his valedictory Presidential address. Adhering to the custom of former Presidents, Dr Brewis referred to the changes which had occurred in the Society during his tenure of office, and also briefly reviewed some of the communications presented to the Society.

During Dr Brewis's presidency, 37 new Fellows had been elected, while the Society had lost 11 Fellows by death, including one Honorary Fellow in the person of Dr G. J. Engelmann, and one Corresponding Fellow, viz. Dr Samuel Lawrence of Montrose.

Dr Brewis paid a special tribute to the memory of Dr Milne Murray, who had served the Society in the various offices of Librarian, Secretary, Vice-President, and President, and who, during his whole connection with the Society, had been a frequent contributor of valuable papers.

Dr Peter Young had held the office of Librarian from 1883-1889, an office which had also been held by Dr James Jamieson from 1875-1879.

In the death of Miss M. Ross, the Society had to record the first death among the ladies who had been admitted as Fellows.

Dr Brewis proceeded briefly to note the features of the more important papers which had been read before the Society. In a review of the specimens exhibited it was noted that of 69 uterine tumours, 43 were fibroids, 3 fibrocystic tumours, 6 cancer of the body, 9 cancer of the cervix, 7 were sarcomata, while there was only one adenoma malignum. There were 30 ovarian tumours exhibited, 6 of which were dermoid cysts, while of the remainder, 5 were solid tumours. In concluding his address, Dr Brewis expressed his thanks to the various officials to whose efforts the Society owed so much of its prosperity, special mention being made of Dr Craig's successful tenure of the office of Treasurer. On the motion of Dr Berry Hart, the Society awarded Dr Brewis a very hearty vote of thanks for the able manner in which he had discharged his Presidential duties.

On the President resuming the chair, Dr E. S. Carmichael read a communication entitled "A Plea for Operative Interference in Cerebral Hæmorrhage in the Child resulting from Dystocia." Drs Barbour, Hart, Paterson, Fordyce, and the President made remarks on the paper. Dr Fordyce, owing to the lateness of the hour, was unable to read his paper on "Pregnancy in a Bicornuate Uterus," but gave the Society a report on his case. The paper appears in extenso on p. 328.

Glasgow Medico-Chirurgical Society

THE tenth ordinary meeting was held on February 16—the President, Dr Lindsay Steven, in the chair. There was a large attendance.

1. Dr Crawford Renton read notes of the following cases of surgical interest: (*a*) Ruptured gastric ulcer with three illustrative cases. (*b*) Dilatation of the stomach caused by adhesions round the pylorus, with account of two cases in which he had operated. (*c*) Malignant disease of the rectum with reference to treatment by Kraske's operation, with three illustrative cases. (*d*) Renal abscess, with report of cases where there were calculi, and where there were nil. (*e*) Removal of the Gasserian ganglion.

2. Dr Renton also exhibited the following cases and specimens: (*a*) An adult patient upon whom he performed laminectomy three years ago for Pott's disease. (*b*) A patient from whose larynx an epithelioma was removed two years ago. (*c*) Two patients upon whom Ballance's operation was carried out for chronic ear discharge. (*d*) A patient who had had an ununited fracture of the tibia in whom 1½ inches of the fibula were excised in order to obtain a satisfactory result. (*e*) A ruptured kidney removed from a patient aged 17 years, who was injured at football; and (*f*) 600 gall-stones removed from one patient.

These cases were discussed by Drs Parry, Rutherfurd, Arch. Young, and the President, and Dr Renton replied.

3. Dr Chas. Cuthbert read a short paper on Ludwig's angina with an illustrative case. The patient was a man of 43, admitted to hospital with huge swelling of the neck, unable to swallow, and breathing with great difficulty. No history of diphtheria or scarlatina. Chloroform was given, and in struggling under it, the patient ruptured the swelling into the pharynx and trachea. Dr Cuthbert at once performed low tracheotomy and about an ounce of pus escaped by the tube. For weeks there was discharge of pus and dark gangrenous material, but the patient eventually made a good recovery.

THE eleventh ordinary meeting was held on March 2—Dr Galbraith Connell in the chair. The attendance was somewhat meagre.

1. Dr W. S. Syme gave the history of a case where the radical mastoid operation was performed for somewhat urgent symptoms. The patient had had a chronic ear discharge for eighteen years, but became worse lately, and had vertigo, rigors, and sickness. These subsided, and it was found that the drum was gone and filled with granulations. The radical mastoid was done, when it was found that the mastoid cells were largely destroyed, there was a bony wall between the labyrinth and the rest of the inner ear, and the sinus was converted into a fibrous cord. The patient did well. The vertigo is now gone. Dr Syme also described a case of double mastoid operation for mastoid empyema, arising from an otitis of measles. The gap behind the ear was filled up, according to Politzer's plan, by paraffin melting at 106° F., and packing was early discontinued, the passage being treated by an instillation of alcohol containing 2 per cent. of carbolic acid after the first week.

2. Dr Stoddart Barr read notes of a case of ear disease in a boy of 7, with paralysis of the sixth nerve on one side. There had been discharge from the right ear for sixteen months, and then headache (frontal) set in, with chilliness, vomiting, and the development of squint and double vision in the right eye. The ear discharge was now offensive; the membrane was gone. Double optic neuritis was present. The radical operation was done, and the dura found healthy, but the bone was softer than usual between the sinus and the dura, and the sinus was covered with granulations. In three months the eye-paralysis had gone. The optic neuritis at first increased and then subsided.

Dr Barr also showed photographs from a case of a man with lipoma nasi of two and a half years' duration. He suffered much from constipation. Under adrenalin and cocaine a cosmetic operation was done, the excessive tissue being sheared away, with a good result.

Glasgow Obstetrical and Gynæcological Society

THE fifth ordinary meeting of the Society was held on February 28—the President, Dr J. K. Kelly, in the chair. There was a large attendance.

The following fresh specimens were shown :—

1. By Dr Scott Macgregor—A uterus with multiple myomata and dilated tube, removed by supra-vaginal hysterectomy.

2. By Dr S. J. Cameron—A uterus with multiple myomata, sub-mucous fibroid, and carcinoma, removed by Dr Jardine; also a fibrous tumour of the ovarian ligament, and a chorio-epithelioma of the fundus.

3. By Dr Munro Kerr—A cystic tumour of the broad ligament which had obstructed labour.

4. By the President—A tubal pregnancy, and a fibroid uterus that had caused only rectal symptoms.

5. Dr Lawrie (Greenock) read notes on a case of Cæsarean section for rachitic pelvis. The patient was a woman of 4 ft. 2 in., a ii-para, who had had a severe craniotomy at her first confinement. The conjugata vera was 2½ in. The operation was done in a small two-roomed house on the kitchen table, but as far as possible the most careful antiseptic precautions were adopted, and the operation was carried through well. The child lived eighteen hours. The stitches were removed on the twelfth day, and the patient did very well. Dr Lawrie also described a case of torn perineum, where he had operated, according to Prior's method, with very satisfactory results. Drs Jardine, Kerr, and the President congratulated Dr Lawrie on the success of his cases.

6. Dr R. O. Adamson read notes of two cases of pyelo-nephritis developing during the puerperium. The first patient was a lady of 27, i-para, who had had slight cystitis at the sixth month. Delivery was by forceps, and the perineum was torn and stitched. There was retention of the urine for the first three days and the catheter was used.

On the nineteenth day the temperature rose to 103° and there was vomiting. The right kidney was enlarged and tender, and there was pus, albumin, and epithelium in the urine. The latter was acid. Treatment was by boric acid and salol, and later tubercle bacilli were found in the pus, guaiacol was given too. The patient is now well. Dr Adamson believed this to be a case of pyelo-nephritis (tubercular), set up by an infection by other organisms from the bladder. The second case was that of a ii-para, who on the fifteenth day after delivery showed albuminuria, red cells, and casts; no tubercle bacilli were found, and the right kidney was tender. By salol and boric acid a good recovery was obtained. These cases were discussed by Drs Munro Kerr, Douglas, Jardine, and the President, and Dr Adamson replied.

7. Dr Arch. Campbell read short notes on a case of measles in a multipara at the end of pregnancy, labour occurring on the third day of the fever, and discussed the question of scarlatinal and measles infection in relation to pregnant and lying-in women.

8. Dr Jas. Craig read notes on two cases of hydramnios, in both of which the uterus attained great dimensions, and in both

of which labour came on naturally and ended spontaneously, a live child being got in each case.

The President, and Drs Jardine, Adamson, Douglas, and Munro Kerr discussed the cases, and Dr Craig replied.

9. Dr Jardine gave a short summary of the proceedings at the first meeting of the Committee recently appointed by the British Medical Association to inquire into Puerperal Morbidity, and to determine a standard for the same.

Forfarshire Medical Association

A SPECIAL meeting of the Association was held in the Royal Infirmary, Montrose, on Tuesday, 16th January. Dr Sinclair, Dundee, President, occupied the chair.

Dr M. Connon, Montrose, exhibited a case of malformation of the lower jaw which he considered congenital, it was first noticed after an attack of measles. Mr Greig thought the condition was an acquired one, being due to periostitis as a rule.

Dr Connon then showed the tonsillar casts from a case of diphtheria which came away in twelve hours after the administration of 6000 units of antitoxin. The case was a very severe one, and the patient died on the eleventh day of the illness. A discussion followed, taken part in by Drs Stone, Greig, Halley, Key, and Sinclair, in which most members agreed that large doses (4000 units repeated several times) were essential in severe cases. It was thought that the type of the disease was milder now than that seen twenty or thirty years ago. Dr Connon also showed a specimen of ruptured kidney, which was removed during life from a man who fell from a height and struck his loin. Soon after the accident, and on several other occasions, he passed blood in his urine and also per rectum. When the abdomen was opened and the kidney removed, no other injury was observed. The man made a good recovery and was now in good health.

Dr Connon then read notes on some recent cases of typhoid fever, in which he described the sanitary, or rather insanitary, condition of the infected houses, and also mentioned some of the peculiarities of the cases. In a discussion which followed, the influence of the water supply in the causation of an epidemic was considered.

Dr Grant, Montrose, read notes of a case of intestinal obstruction, followed by peritonitis with metastatic abscesses.

Dr Hoile, Montrose, reported a case of congenital syphilis, the unusual feature of which was a swelling of the right testicle. The swelling appeared six weeks after birth, remained for about

the same time, and disappeared when the child was about three months old. He considered it to be a case of syphilitic orchitis.

The members were then taken round the wards of the Infirmary, and several cases shown there.

THE fourth ordinary meeting was held in Dundee on February 1, Dr Sinclair in the chair.

Mr Greig exhibited two patients after operation for the radical cure of varicocele and hydrocele. The first case was that of double varicocele operated upon a few years ago, which showed the satisfactory result of the operation described by Mr Greig in the *Scottish Medical and Surgical Journal* of September 1898. The second case was one of hydrocele of long standing, which had been tapped twelve times, and now showed the good result obtained by the operation of evagination.

He also showed a cast from a case of congenital talipes calcaneo-valgus.

Professor Stalker showed a specimen of perforating ulcer of the stomach, with a cicatrix close to it of a former old healed ulcer. Also a specimen of cancer of the liver, with a nodule at the biliary papilla.

Dr Pirie showed radiograms of the thorax in health and disease, including several cases of tubercle of the lung in various stages, carcinoma of the mediastinum with displacement of the heart, and hypertrophy of the heart.

Professor Kynoch read notes on three cases of labour complicated with carcinoma of the uterus, which appear on p. 324.

Dr Don read a paper on the Diagnostic Value of Radiography in Fractures.

He explained that the object of the paper was to bring out the value of radiographing all obscure and difficult bony lesions both before and after putting them up in splints or otherwise. By such means only could the best possible results be obtained and the surgeon would be saved the ignominy of having failed to diagnose and properly treat a fracture, and possibly having to defend his work if an action of damages was brought against him. The surgeon should, therefore, be able to correctly read a radiogram when the details of the taking of it were given him. How necessary was it to know the details was illustrated by a series of radiograms showing distorted views of accurately set fractures, and radiograms of fractures which completely obscured the lesion. The blurring effect of secondary and adventitious rays were shown and explained, as well as the production of these rays. It was also shown how dense muscular tissue or

blood-clot and the overlapping of bones in joint lesions were apt to hide fractures unless the best position for taking the radiogram had been first ascertained by a thorough examination with the fluorescent screen. The medico-legal aspect of radiography was considered, and it was thought advisable that only experts should give an opinion in law courts from a radiogram alone. The paper will appear in full in a future number of the *Journal.*

In the discussion which followed, Dr Pirie agreed with Dr Don, and suggested that lengthened exposure of the plate would do away with many faults such as overlapping.

Dr Halley emphasised the importance of getting a picture from various points of view.

Mr Greig stated that the value of radiography could not be over-estimated in the diagnosis and proper treatment of fractures; and in every case of fracture he would like to get a radiogram before, during, and after treatment. Many an injury was missed if no radiogram was obtained. He considered that X-ray photography was to revolutionise the classification of fractures; and many injuries of bones, especially of the phalanges, which had previously been looked upon as bruises or "staves," would in the future be found to be in reality fractures. The so-called typical Colles' and Pott's fractures would now require to be sub-divided. He agreed that it was absurd for a judge in a court of law to give an opinion or decide an action on a radiogram alone. He hoped before long that more satisfactory photos of calculi in the kidney, ureters, and bladder would be obtained.

AN ordinary Meeting of the Society was held in Dundee on the evening of March 8—Dr Lennox, Vice-President, in the chair.

Dr M'Gillivray presented several cases. The first was that of a man with chronic senile ectropion. He considered that for the relief of the trouble the operation by means of Snellen's sutures was best. The second case was that of a young girl who suffered from a very high degree of myopia—16D. The lens had been removed from the left eye, with very satisfactory result, and the right eye would be treated in a like manner. The third case was one of neglected iritis. There were complete annular synechiæ with secondary glaucoma. An iridectomy was done, and relief obtained. The fourth case was a boy who received a blow on the left orbit, which had produced homonymous diplopia, caused by paralysis of the superior oblique muscle. He then described a severe case of gonorrhœal oph-

thalmia in a young woman, with considerable corneal ulceration, which had been successfully treated by 25 per cent. solution of argyrol used every two hours for a week.

Dr H. Buist showed a case of elephantiasis in a woman, 24 years of age. The right leg was the affected part, and measured at the calf 20½ inches, and at thigh 26 inches, compared with 13 and 18 inches in the left. The swelling began about eight years ago in the foot and gradually extended upwards. There was no pain.

Dr G. Pirie showed a case of lupus successfully treated by X-rays during a period of six months. A series of photos, at various stages of the disease and treatment, was also exhibited.

Professor MacEwan exhibited specimens obtained from a patient sent into hospital with intestinal obstruction, but who died from collapse following perforation of the bowel before an operation could be attempted. On post-mortem examination the whole large intestine was found to be studded with small adenomatous growths. There was a large adenoma at the hepatic flexure, causing complete obstruction, and not far from this was a small perforation. A large tumour, the size of the fœtal head, was found in the right suprarenal gland, which, on macro- and microscopic examination, appeared to be of a sarcomatous nature. Another complex renal tumour, with pyonephrosis and suppurative nephritis, was also shown.

Dr Foggie read notes of a case of congenital dextro-cardia, which he had had under observation since birth, and on which he had lately obtained a post-mortem examination. The child, who lived to the age of two years and ten months, had sprung from a stock prone to rheumatic and cardiac affections. In addition to the displacement there was a loud systolic murmur, and also latterly a diastolic. The general growth and appearance was that of one subject to congenital heart disease or heart defect. Death resulted from convulsions after a few weeks' attack of whooping-cough. The autopsy showed a heart on the right side. The other organs were not transposed. There was a common auricle, and the inter-ventricular septum was defective. The pulmonary and aortic valves were normal, but the tricuspid and mitral were markedly incompetent. The ventricular walls were thickened and showed fatty degeneration of their substance. There was no evidence of lung disease, and the diaphragm was intact. There were now about fifty cases of congenital dextro-cardia on record, but only a few of these had been verified post-mortem. Apart from those due to lung disease, or to total transposition of the viscera, cases of congenital dextro-cardia generally owed their origin to diaphragmatic herniæ, lung malformation, or embryonic errors in the heart areas. The

malposition in the last was generally accompanied by some heart defect.

Professor Stalker, who had seen the case in life, said he had some difficulty in coming to the conclusion that it was one of congenital dextro-cardia in the ordinary sense of the word, as complete displacement was so very uncommon. It might have been acquired and caused by the excessive preponderance of the auricles, but the fact of the apex beat always being to the right was against this supposition.

Dr Don read notes on "The Diagnostic Value of Radiography in Tuberculous Disease of Bone." The effects of tuberculosis in bone were first discussed as regards new osteophytic formations, softening, and cavitation, and radiograms of each stage shown, and their value in establishing or confirming a diagnosis brought out. The value of such a radiogram to a surgeon in determining his line of treatment, or in planning the extent of his operation, was explained; while, in the case of abscess cavities of obscure origin, the radiogram would in all probability show the real origin of the disease. The method of examining the negatives by means of a view case to bring out details, and the value of a stereoscopic screen examination, were explained, and a hope expressed that more use would be made of the X-rays for such lesions.

Professor MacEwan agreed that the X-rays were of use in getting a photograph of bone disease, but was doubtful if it was of any great value in the very early stages.

Editorial Notes and News

The Administrative Control of Pulmonary Phthisis.

THE circular issued by the Local Government Board for Scotland on the tenth of March dealing with the administrative control of pulmonary phthisis marks an epoch in the history of preventive medicine. For the first time the Local Authorities, charged with the oversight of the Public Health, are informed that pulmonary phthisis is an infectious disease within the meaning of the Public Health Act, and that it is their duty to control phthisis as other infectious diseases are controlled. It is laid down that a system of notification is essential, and that compulsory notification will be approved by the Board if the Local Authority is prepared to deal with the notified cases with a view to curative treatment and to the prevention of infection. The provisions of the Act in relation to disinfection are recapitulated, and it is pointed out that measures of disinfection should be

applied not only to the homes and workplaces of phthisical patients, but also to places of public resort and to public conveyances. Special attention is directed to the danger of spitting, and to the means of obviating this danger. The prohibition as to exposure of infected material and of infected persons may also be enforced in relation to phthisis, and the Board further suggest that the Local Authority should see that no phthisical person is engaged in any occupation connected with food. In regard to the isolation and treatment of the disease, the circular includes full details of a scheme which includes dispensaries, sanatoria, and hospitals, so that for each case suitable means may be available. It is suggested that Public Health Committees should confide the supervision of this system of control to a special sub-committee—the Phthisis Committee. In conclusion, Local Authorities are reminded that the whole scheme of direct control of phthisis is merely adjuvant to measures of general sanitation.

While recognising the great value of the impetus thus given by the Board to the preventive care of phthisis, we question whether there will be many Local Authorities willing to undertake at once so full a scheme of administrative control. The application of the Public Health Act to phthisis—a course not contemplated at the time the Act was passed, and still somewhat in advance of public opinion—demands from Local Authorities and their executive officials much discretion and judicious discrimination. But even where a Local Authority does not adopt *in toto* the views of the Board, much good should result from the circular if it cause the Authority to undertake thorough disinfection of public places and conveyances. Further, no one can deny the advantages of a regular disinfection being carried out by the Local Authority in every house in which a person has died of pulmonary phthisis. The removal to an isolation hospital of advanced cases which are without proper home accommodation will also commend itself to many authorities. The Board would, we believe, act wisely in approving compulsory notification even when the Local Authority has only in view the obligation of disinfection and the treatment of advanced cases, and is not yet prepared to undertake the cure of incipient phthisis. We trust that, in response to the circular, Local Authorities will bestir themselves and make an effort to utilise some at all events of the powers at their disposal.

The Edinburgh Water Scare.

So much has been said in the public press about the Edinburgh water scare that we feel we need not go into the matter at any length, but the subject is too important to be passed over

altogether. The main facts, in brief, are that from time to time complaints have been received from various parts of the city of the occurrence of "insects" in the drinking water. On investigation these insects turned out to be various species of "springtail," belonging to the sub-order Collembola. The source of the invader was neither the city water supply nor unclean cisterns, but was traced to the street hydrants.

It appears that two types of hydrant are in use in the city, these being the valve and the ball hydrants. Of these the former seems to work satisfactorily, but the latter is quite inefficient. The chief sanitary inspector, Dr Williamson, in his report on the subject, says: "I was much impressed by the fact that no amount of attention paid to the cleansing of the hydrant boxes containing hydrants of the ball type could be expected to prevent the objectionable contents of these boxes periodically gaining access to the main water supply. It was apparent that, after a heavy shower of rain, a large quantity of material, representing the washings of the roadway, finds its way into the boxes, and from thence directly into the water supply the moment the pressure is lowered the slight degree necessary for the displacement of the ball valve."

That this really takes place was readily shown by an experiment whereby, after carefully cleansing several cisterns, the inspector was able to wash a number of insects from infected hydrants into the cisterns, capturing them there by means of muslin bags fastened over the inflow pipes.

It is not very long since we published a note on Cleanliness in Public Life, calling attention to the discreditable condition of the Edinburgh streets, but we confess we had little idea at the time that there was any danger of the washings of the streets finding their way directly into the drinking water. The revelation is no less surprising than disconcerting. The ball hydrants have, indeed, been known to be unsatisfactory for years, and have been under a process of gradual replacement by the more efficient valve form. But until the Collembola appeared in the water, it does not seem to have occurred to the authorities to test the efficiency of the hydrants in preventing street refuse from being carried into the cisterns. As the ball hydrants are only being replaced as they become worn out, there seems to be no doubt that but for the Collembola, many of the citizens of Edinburgh would not only have been exposed to the danger of having their water from time to time polluted by nameless abominations, but that their water would actually have been so contaminated. The Committee now assure us that they are satisfied that there is no cause for public alarm, nor any danger whatever to the public health. But what of the past? May we

not have here one cause of the great prevalence in Edinburgh of sore throats of a severe nature? It is of course impossible to say whether what is commonly called septic sore throat is of more frequent occurrence than formerly, as this disease is not notifiable, but it is somewhat suggestive that diphtheria has been increasing steadily for some years, and that this increase has not yet been explained.

In the last available report of the Medical Officer of Health for Edinburgh, which deals with the year 1904, we find that in that year 752 cases of diphtheria were reported, a number which exceeds the previous highest record, viz. 575 in 1903.

A table is published showing the monthly notifications as a percentage above or below the mean monthly number of notifications during the last eleven years, viz. 33.6 cases.

This table shows that during the first six years, 1894-1899, the monthly number of notified cases was, with a few isolated exceptions, consistently below the mean, whereas during the last five years the opposite state of matters is found, and not only so, but the percentage above the mean is very much higher than it ever was below it during the early period.

The cause of this increased prevalence is not apparent. It is not connected with the milk supply, nor with any obvious sanitary defects in the houses where the cases occurred, since, in every instance, an examination of the sanitary arrangements is carried out by the Burgh Engineer and the result recorded.

Whether sore throats, diphtheria, or other diseases have actually been due to the defective hydrants we do not know, but a city's drinking water should be above suspicion, not only at its source, but as it issues from the consumer's tap. There are, it appears, in the city 2300 of the defective hydrants. Of these the Committee propose to remove perhaps 500, leaving 1800 still in use. These 1800 are to be replaced gradually by valve hydrants in the course of the next six years. In the meantime the remaining ball hydrants are to be protected by stoppers. As to this proposal, we can only say that we hope these stoppers will be immediately forthcoming, and that their reliability will be thoroughly tested by the responsible authorities. The discovery of defects of so serious a nature should not be left to chance.

Recent Appointments.

We have this month to chronicle an unusual number of appointments. The University Court of Edinburgh has appointed Dr Freeland Barbour Lecturer on Gynæcology, and the Managers of the Royal Infirmary have placed under his care the ward formerly in charge of the Professor of Midwifery.

This makes a vacancy in the post of Ordinary Gynæcologist, to which Dr Barbour had just been elected in succession to Dr Berry Hart. To this Dr Brewis, the Senior Assistant Gynæcologist, has been promoted. There will thus be two vacancies on the junior staff, for which there will be no lack of candidates.

Drs Stuart M'Donald and Lyon having resigned their posts as Assistant Pathologists, the Managers took advantage of the opportunity to make a new appointment of a Clinical Pathologist, who will be specially responsible for special ward work. We hope that instead of causing the House-Physicians to do less, the opportunity of getting help from a trained pathologist will stimulate them to do more ward-laboratory work. Dr W. T. Ritchie was appointed to the new post, and Mr Wade and Dr Carnegie Dickson to the Morbid Anatomy department. We believe this is the first time a surgeon has been appointed to such a post, but the new departure has met with general approval.

In the Glasgow Royal Infirmary a great many changes have taken place, several new appointments have been made, and there are still a good many vacancies to fill up.

Messrs Clark and Knox having retired under the age limit, the Managers have appointed Messrs Rutherford and P. Paterson Surgeons in their room. Dr James Adam was appointed Assistant Otologist.

The Teaching of Gynæcology in Edinburgh.

THE delay in arriving at a decision in this matter has been fully justified by the result, and the scheme which we understand is now practically adopted is a great improvement on that originally put forward, and is indeed very near to that we suggested some months ago. The Managers of the Infirmary have allowed the University Court to nominate the Lecturer, and the Court has wisely nominated the Senior Gynæcologist to the Infirmary, while arrangements have, we understand, been made for his colleague, the Junior Gynæcologist, to co-operate in the teaching. The only matter which we regret is that Gynæcology still remains a part of the course of Clinical Medicine, and we have some hope that before long the authorities will come round to our view. Gynæcology must be taught to small classes, and the lecturer will only be hampered by what will after all be but a loose connection with that course.

The combination of the two wards is a more important and a more far-reaching action than appears on the surface. Time was when the extra-mural school was largely modelled on what may be called Triple Qualification lines. That is no longer the

case. Thanks to the Carnegie Trust the doors of the University are now open to the poor Scots students, and the teaching of the whole Edinburgh School is now of the University level. We welcome, therefore, anything tending to consolidate the school, and such this co-operation in the teaching of Gynæcology certainly is.

The Glasgow Lunacy Case.

ALL our readers will sympathise with Drs Carswell and Gilchrist who, although the verdict in the recent trial was entirely in their favour, find themselves liable for a sum of over £900 of expenses. There is obviously something wrong with a law which allows so manifest an injustice, and steps should be taken to modify it. But in the meantime it is clearly the duty of the profession to sympathise practically with the victims. A fund has been opened, and subscriptions will be received by Dr W. G. Dun, 15 Royal Crescent, Glasgow.

Such cases should impress on all practitioners, young and old, the urgent necessity of joining a Medical Defence Association. When the prosecutor in a vexatious case finds that the defendant is a strong Medical Defence Union and not a helpless unit, he is more apt to abandon than to continue the case.

American Football.

WHEN we consider the hundreds or rather thousands of men and boys who in this country play football every Saturday during the winter months, the rarity of severe accidents is really noteworthy. The case is different when what is termed "American" football is investigated. We know that the characteristics of various animals and plants are altered by transplantation to other lands, and the raids committed by the humble rabbit, house sparrow, etc., have become serious items in the welfare of certain of our colonies. "American" football is an exotic type of Rugby football and is apparently the most dangerous game played —since faction fighting was stopped in Ireland.

Before us lies an article on "The Physical Aspect of American Football," by two American surgeons. These gentlemen state that they have made most careful inquiries and studied the injuries received by the playing squad of Harvard University from September 12th to November 25th, 1905. Roughly speaking, 150 men were in this playing (?) squad, and the injuries noted were 145. These included 19 cases of concussion, 13 sprained ankles, 12 cuts which required suture, 11 dislocations of the acromial end of the clavicle, 10 dislocated semi-lunar cartilages, not to mention 7 broken noses, 4 fractures of the rim of the

pelvis, a fractured second cervical vertebra, a middle meningeal hæmorrhage, and other comparatively minor injuries, all occurring in nine weeks.

The New Zealanders chanted their war cry before each of their matches; the Harvard footballers might fittingly before the kick-off turn to the grand stand and shout, "Vulneraturi vos salutant."

The Edibility of the Spleen.

UNDER this heading Dr Williams discusses in *American Medicine* the reason why these organs are never eaten. He observed that they were greedily devoured by butchers' dogs, and wondered whether it was not pure prejudice. On making experiments, he found that it apparently was. He broiled a spleen on a gridiron and made a meal of it. It had the consistency of liver, but a more agreeable flavour. The best method of cooking he found to be stew, and he and his friends found this not only pleasant but stimulating. Although the spleen when removed is not a tempting-looking object, cooking alters its consistency. It must be eaten perfectly fresh. Eight hours after slaughtering it is inedible, even if kept on ice. He calculates that over 50,000,000 lb. of spleens are thrown away yearly in the United States, and comments on the mistake of throwing away organs containing all the elements necessary to make healthy blood, notably iron and phosphorus.

Letter to the Editor

The Food Factor in Disease

SIR,—I trust you will allow me space for a few remarks in reply to the review of my book, "The Food Factor in Disease," which appeared in your issue of February. Your reviewer regards the entire work as an argument to prove that most of the diseases to which flesh is heir are due to an accumulation in the blood "to an ultra-physiological degree of carbonaceous material," that is, to the condition termed "hyperpyræmia." I have not intended to make so exclusive and extensive a claim. What I have attempted to show is that hyperpyræmia is very often *a* factor in numerous pathological affections.

The size of the volumes is no doubt appalling; of this I am fully conscious. But the contained theory depends almost solely on circumstantial evidence; and circumstantial evidence,

to be at all convincing, must be "most abundant in circumstances."

The theory or hypothesis of hyperpyræmia is, so far as I know, entirely new; as such it would be strange indeed were it to carry conviction from the outset. But I am not without hope that it will do so eventually. Even now there are those who have accepted its fundamental truth. Amongst those is Professor Chittenden, whose recent work on "Physiological Economy in Nutrition" is so well known, and who has generously allowed me to make the following extract from one of his letters:—"I have no doubt that the main part of your thesis relating to the blood-state or blood-states, under the term of 'hyperpyræmia,' is correct."—I am, Sir, yours faithfully, FRANCIS HARE.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

GENITO-URINARY SURGERY

By DAVID WALLACE, C.M.G., F.R.C.S.

TUMOURS OF THE BLADDER

THERE is at present so much written regarding the surgery of the genito-urinary tract that the difficulty in making an abstract from the literature, is not lack of material, but the choice of the subject. In the *Annals of Surgery* for April 1905, practically the whole of the number was taken up with the subject of the prostate, several important and instructive papers, from the pens of well-known surgeons, being presented to the reader. An abstract based upon these has already been given in the August number of this journal, and it is unnecessary to refer to them further. The papers in the December number of the *Annals of Surgery* are again almost entirely devoted to genito-urinary surgery, and to two of these upon tumours of the bladder I purpose to direct attention in this abstract, while at the same time I summarise the papers and reports which have been recently published in the Transactions of *L'Association Française d'Urologie* (ninth session, 1906).

Dr Francis S. Watson of Boston in a paper, "The Operative Treatment of Tumours of the Bladder," advances a proposal to "substitute bilateral lumbar nephrostomy and the establishment of renal fistulæ in cases of bladder tumour, for ureteral implan-

tation in connection with bladder resection or total extirpation, and that the bladder operation be done after an interval and not together with the nephrostomies." The author has collated reports of 653 cases of bladder tumour for which operative treatment was adopted. Of these, 243 were benign and 410 were malign growths. The varieties were: *Benign*—papillomata, 203; myomata, 20; myxomata, 16; adenomata, 2; angiomata, 2. *Malign*—carcinomata, 358; sarcomata, 52. In the benign, including myxomata, the general operative mortality was 17 per cent. In the carcinomata, 27 per cent. In those cases in which suprapubic operations, not resections, were performed, the mortality in papillomata was 11.3 per cent., while in the carcinomata the mortality was 28 per cent. In those cases treated by partial resection of the bladder the mortality was: in papillomata, 17 cases, 1 death; myomata, 4 cases, 1 death, equal to 9.5 per cent.; while in 91 cases of carcinomata there were 17 deaths, equal to 18.6 per cent. mortality. In 25 cases of carcinoma in which total extirpation of the bladder was used there were 14 deaths, equal to 56 per cent. mortality.

It is interesting to note that where partial resection of the bladder was used in 91 carcinomata, the death-rate was 18.6 per cent., while in 222 cases in which the tumour was of the same nature, and suprapubic operation without resection was used, the mortality was 28 per cent.

Recurrence of the tumour growth in benign tumours was rapid in 20.5 per cent. of 195 survivors, while in carcinomata, rapid recurrence occurred in 26.8 per cent. of 261 survivors. Further details are given, but "the sum and substance of the result of the operative treatment up to the present time may be stated thus: If the operative deaths and rapid recurrences are combined under the one heading of operative failures, such failures are seen to have occurred in 28.6 per cent. of benign tumours, exclusive of myxomata, and in 46 per cent. of the cases of carcinomata."

Dr Watson states the pros and cons of operation in the light of the above statistics, and pleads that failure is in large measure due to delay in operating, and to defects in the methods of operation, and then he proceeds to advocate the adoption of bilateral lumbar nephrostomy, to be followed by total extirpation of the bladder in all cases of intrinsic carcinoma, and in all cases of benign growth in which recurrence has taken place after a primary operation for their removal. He believes nephrostomy is safer and better than ureteral implantation. To strengthen the view that this is a practical suggestion, the author gives the results of 114 cases in which ureteral implantation has been used for varying conditions. The actual mortality was 41.2 per cent.,

while that directly due to ureteral implantation was 44 per cent. of the fatal cases. He next considers the mortality in a series of 979 cases of nephrostomy for all conditions, in which it was 15 per cent.

It is always difficult to judge fairly the relative mortality from different operative procedures, but the author believes any unfairness in the comparison between the two operations is against nephrostomy rather than against ureteral implantation, and quotes Legueu, who says, "in renal infections the dangers attaching to nephrostomy are *per se* almost nothing." The objection to nephrostomy he believes is not its danger, but the belief that it inflicts disability and distress upon the patient. This objection, he says, does not exist, as, by a simple apparatus —which, by the way, he does not describe—all distress and disability are removed.

In the technique, the nephrostomy must be followed by an interval of four to six weeks before the bladder operation is undertaken. The operation for this latter part is described in detail, but the author is careful to repeat that the proposal he makes for the treatment of bladder tumours is merely suggestive, and up to now has not been practised by himself.

In the light of this paper, which is really based upon what is tantamount to the admission that operative treatment of vesical tumours has hitherto been most unsatisfactory, it is of much interest to consider the report which M. Rafin has drawn up for the French Association of Urology, and submitted to the Association at their ninth annual meeting, and to note the views of some of the members and the results of their experience. Before doing so, however, it may be pointed out that much of Dr Watson's paper is based upon statistics which include many cases, perhaps a majority, collected before 1892, and again before 1897. Surgeons working at genito-urinary surgery recognise the great advances made since these dates in the diagnosis and treatment of vesical tumours. Also that patients come before them earlier in the disease, and that medical men generally appreciate the importance of investigating the cause of hæmaturia, the first symptom of tumour of the bladder in so many cases, at the earliest possible time. In malign tumours, the advantage of the early recognition of their presence is self-evident from the operative standpoint, but this also holds in relation to simple tumours, as through time they become more extensive, and, in the opinion of some, tend to acquire a malignant character. It is undoubted that the earlier operation is performed, whether for malign or benign growths, *cæteris paribus*, the greater the likelihood of a successful result. With these facts in our mind, it was natural to hope that the statistical

statements of M. Rafin, based in great measure upon recent literature, and upon personal communications from surgeons of cases which had not previously been reported, would prove much more satisfactory, and that improved technique would lessen immediate mortality and improve remote results. Such a hope unfortunately is not borne out by the statistics of Rafin, and indeed we find that his results and those of Dr Watson, already quoted, are in effect almost identical.

Rafin directs attention to the duration of papillomata before advice is sought by the patient. In 174 cases, there were 75 which, to judge by symptoms, had originated within one year, while 80 others had been present from two to six years, and the remaining 19 for a longer period than six years. He also points out that after the removal of a papilloma, recurrence may be in the form of a malign carcinoma.

Regarding results in 156 suprapubic operations in 133 patients, the mortality was 6, equal to 3.8 per cent., while the later results, in 91 cases, gave 24 recurrences and 67 cures. The duration of the latter were: 26, 1 year or less; 11, 2 years; 10, 3 years; 10, 4 years. In reference to carcinomata, he quotes Guyon, who said, "Carcinoma cases when seen were too late for operation," and also the views of Clado and Pousson, that in very many cases operation is inadmissible, while others require complete excision of the affected portion of the bladder wall. He then refers to 82 communicated cases in which curative operation was inadmissible, and, in this connection, makes special reference to the invasion of lymphatic glands by the disease, and directs attention to recent work upon the lymphatic relations of the bladder to show that secondary glandular infection is liable to occur.

The results in 146 unpublished cases communicated by surgeons were as follows. Radical treatment by ablation of the tumour in 57 cases gave a mortality of 14 per cent. In the 49 survivors, there were 11 without recurrence and 28 in whom recurrence or death occurred during the first year. In 10 there was greater delay, or the time since operation was too short for the cases to be of any significance. Palliative treatment was adopted in 89 patients, and few of these lived longer than six months. Partial resection of the bladder was resorted to in 96 cases with 21 deaths, equal to 21.8 per cent. mortality. The remote results, however, were slightly better than those in whom simple ablation of the tumour was adopted, although the mortality was greater.

Total extirpation of the bladder for a tumour is a serious operation, and the therapeutic results do not compensate for its immediate gravity. This is readily understood when we re-

member the risk of peritoneal infection during the operation, and also the need for dealing with the ureters. Rafin shortly reports 30 cases in which total extirpation has been performed. Death occurred, as an immediate result, in 17 cases, equal to 56.6 per cent. No details are given of 5 patients who lived for a time, while of the other 8, 3 died in less than one year. Dr Watson's suggested method was not used in any of these cases.

M. Rafin gives statistics of benign tumours other than papillomata, but it is not necessary to refer to these, as their occurrence is relatively comparatively infrequent.

Sarcomata are shown to be, in a series of 56 cases, much more dangerous to life than carcinomata. The results of operation in their treatment are truly deplorable. It is not unworthy of note that the relative number of sarcomata reported in the series of bladder tumours by different surgeons varies widely. Albarran, in 89 cases of tumour, found 2 sarcomata. Pousson, in 50 cases of operation, found no instance of sarcoma. Contrarily, Lobstein, in 46 operations from Czerny's clinique, found 18 carcinomata, 16 papillomata, and 12 sarcomata. In the November *Annals of Surgery* there is a report by Dr Darling, Clinical Professor of Surgery in Michigan, upon a sarcoma of the bladder in a child 4 years of age. He gives a table of 18 cases of sarcomata in children under 12 years of age, and quotes Vanderveer, who remarks upon the rarity of the disease.

M. Rafin's report extends to 150 pages of the Transactions of *L'Association Française d'Urologie*. He has evidently taken great trouble to get as complete a record of tumours of the bladder as possible, and a careful study of the report bears out the conclusions he arrives at, which, to the reader of this abstract, must very plainly be, that the treatment of malign tumours of the bladder constitutes a most unenviable feature in surgical work. Why this should be so is not wholly inexplicable when we consider the site of the tumour—near the trigone—in many cases, the late period at which patients seek advice, and the difficulty of thorough excision of the growth without interference with the ureteral openings. The classical division of Guyon of the attachment of tumours—pedunculated, implanted, and infiltrating—is important in prognosis. How it will be possible to improve the outlook for patients who suffer from vesical neoplasm is most important. It would appear that early accurate diagnosis is a first essential, and this can only be done by cystoscopy, by means of which prognosis, as well as diagnosis, can be approximately gauged. Where bimanual examination suffices to indicate the presence of a vesical neoplasm, in all

likelihood curative operation is impossible; and if the symptoms do not urgently necessitate a palliative operation, cystotomy should be delayed as long as the patient's condition permits.

In the discussion which followed the reading of Rafin's report, Albarran, Motz, Malherbe, Escat, Hamonie, and others took part, and all of these surgeons in effect bore out the conclusions at which Rafin arrived; but especial attention must be directed to the remarks of Weinrich, who reported the results of intravesical treatment in Nitze's clinique. These results as reported are of the greatest interest, and certainly show that the intravesical procedure in benign tumours—papilloma—is strikingly successful. Nitze has observed, up to the end of 1904, 399 cases of vesical tumour, of which 177 were malign, 94 benign, and 128 not exactly determined. The 271 examined anatomically were made up of 170 papillomata, 87 carcinomata, 2 adenomata, 7 sarcomata, and 5 myomata. One hundred and fifty papillomata have been operated upon intravesically by means of Nitze's operation cystoscope. The large size of a tumour does not contra-indicate this method of operation; it merely means that several sittings are required for its removal. Portions cut off are left in the bladder to be passed during micturition. Bleeding, as a rule, is not great, and in no instance has it been necessary to use operative methods for its arrest. No deaths have followed from the operation *per se*. In 101 cases which have been operated upon in this way since 1902, there are 71 without recurrence, 18 with recurrence, and 12 which have not been followed. Of the others which make up the 150, some present no recurrence, but in them the time is too short to judge of the result, and others are still under treatment. In half of those in which recurrence took place the tumour was multiple, which indicates that there was a tendency to return, and in 9 others the return of the tumour was at a different point from the primary growth, so that the method of operation was not the cause of the return. Malign tumours are not suitable for this method of operation, and in them Nitze uses partial resection of the bladder wall, but his results are no better than those of other surgeons. Up to the end of 1904 he had operated upon 41 cases with the following results: cures, 4; recurrences, 32; deaths, 5.

The results of intravesical removal as reported by Weinrich are important, but it is always difficult to judge of the value of a procedure without knowing in detail the history, etc., of the disease in the cases which make up the series. We would judge that very many of Nitze's cases must have been treated early in the disease, more especially as the proportion of benign tumours to malign differs so much from that of other observers. If

Nitze's method be equally efficacious, or more so, than cystotomy with ablation of the tumour, it would be a great advance in the surgery of vesical tumours.

OBSTETRICS

By R. G. M'KERRON, M.A., M.D.,
Physician to the Maternity Hospital, Aberdeen

THE EXPECTANT TREATMENT OF PUERPERAL ECLAMPSIA

WHILE few subjects are of greater interest or importance to the practitioner than the treatment of puerperal eclampsia, there is none on which obstetric opinion is so divided. The reason is to be found in the uncertainty which exists as to the true pathology of the condition. In spite of much clinical and experimental study, and of ample opportunity for pathological investigation, we are still far from a correct explanation of the occurrence and causation of eclampsia. Many theories have been suggested, but none adequately explain all the phenomena. No doubt considerable advance has been made from the old belief that in the kidneys was to be found the primary cause of eclampsia. It is now generally recognised that the eclamptic condition is the result of a toxin poisoning. How and where exactly this toxin is produced, what organs are affected, and whether affected in the same relative degrees in different cases, are questions which still await a solution.

The uncertain position of the pathology is amply reflected in the treatment; and evidence of the great lack of unanimity which prevails in this respect is to be found in the very suggestive review by Comyns Berkeley in the *Journal of Obstetrics and Gynæcology* of March 1904. Impressed with the diversity of opinion which obtained among obstetricians, it occurred to him that it would be both interesting and profitable to compare the methods followed by the various authorities in the United Kingdom. Circulars were accordingly despatched to all teachers of obstetrics, obstetric physicians, and physicians to lying-in institutions. Unfortunately the result did not fulfil the expectation of the author that a basis might be obtained for the formulation of a definite and uniform method of treatment. The fifty-six replies received served only to emphasise the wide difference in practice which prevailed, and to lead the author to the confession that it was impossible to reconcile all the different statements and results. While one man claimed

to get his best results with the most forcible means of delivery at his disposal, another's experience seemed to show that exactly the opposite method was the best. There was no approach to uniformity either as regards the therapeutic or the obstetric treatment. Diametrically opposite opinions were expressed in regard to almost every one of the methods, and, strangely enough, were often supported by figures. This may be illustrated by a reference to chloral. Charpentier, who employs chloral in preference to all other remedies, found that in a series of cases the mortality was 4 per cent. when chloral only was given, but when it was combined with any other line of treatment the death-rate was 8.5 per cent. Herman, however, refuses to accept these figures as correct, on the ground that no medical man would give chloral to a comatose patient, and hence there would be a natural selection of the milder cases for this drug. A reference to the replies received by Berkeley shows that the majority do not use chloral. Some thought it occasionally useful; others believed it to be ineffective, or even dangerous. Eden thinks it inferior to morphia; Stephenson considers that it is not to be trusted in a fully developed attack; while Byers maintains that "when it is given to control the fits, it acts just like the poison which is the cause of eclampsia, and increases the tendency to death."

So with the other remedies employed; the same difference of opinion exists. Berkeley suggests, what is probably the real explanation, that eclampsia is, like puerperal fever, "a symptom of a number of separate and distinct diseases and, therefore, the results of treatment might differ, according to what variety one was treating." If this is so, the treatment must remain more or less empirical till we are able clinically to distinguish the different forms.

It might have been expected that in the obstetric treatment at least there would be some approach to uniformity, but here, too, Comyns Berkeley found a conspicuous and disappointing lack of agreement. A reference to the replies he received showed that opinion was almost equally divided between those who were in favour of and those who were opposed to any interference when labour had not actually begun. When it had begun, the majority were in favour of hastening delivery, but there was a wide difference of opinion both as to the time and manner of giving assistance. Some would interfere only after the cervix was normally dilated; others would aid dilatation either manually, instrumentally, or by incision; a few would not interfere at all unless the condition was such as to call for urgent treatment.

Herman stood alone in maintaining that the only proper and

safe treatment was to do absolutely nothing unless some complication, other than eclampsia, called for further treatment.

In a previous summary (February 1904) attention was drawn to a paper by Bumm, in which he reviewed a personal experience extending over twenty years and including 112 cases. The author's object was to emphasise the value of immediate delivery in all cases of eclampsia by the most rapidly available means, by cervical incisions where necessary. An analysis of his cases showed that this method was attended with a mortality of only 8 per cent., in contrast to a mortality of 30 per cent. with any of the methods previously employed.

From the discussion which took place at the International Congress at Geneva and at Paris, as well as from recent literature, it would appear that the majority of obstetricians, if not going so far as Bumm, are in favour of the active treatment of puerperal eclampsia. Herman, while admitting that under favourable conditions as regards asepsis operative treatment gives somewhat better results, is convinced that the opposite would be the case were "hurried delivery indiscriminately practised by all who attend labour in all cases."

The object of the present review is not to discuss the relative merits of these two methods, for which the available material is insufficient, but to consider the details of the latter or so-called expectant treatment. This method, originally introduced by Veit, has been adopted and greatly elaborated in the practice of the Rotunda Hospital, with the result that the mortality has been reduced by more than half. For the four years previous to 1892, when Veit's treatment was adopted, the mortality was 35.3 per cent., while after that date the statistics show a death-rate of 16.9 per cent.

The details of this treatment, as carried out at the Rotunda Hospital, have been described by de la Harpe (*Journal of Obst. and Gynæc.*, February 1906). He states the objects to be aimed at as: first, the arrest of the fits; second, the elimination of toxins present; third, the placing of the patient in the best possible position for the avoidance of pulmonary complications; fourth, the surveillance of heart, lungs, and kidneys, and the stimulation of these organs where necessary. While these points are attended to with a thoroughness which has not been attempted before, the feature in which this method chiefly differs from existing practice is the avoidance of all interference with pregnancy and labour.

The details of the method are given by the author in full. Each, in his opinion, is more or less essential to success. They are as follows:—

(1) Half a grain of morphia is given hypodermically, and

repeated, if necessary, in a dose of quarter of a grain every two hours, up to a maximum total of two grains in 24 hours.

(2) Large quantities of water are given to drink, but where this is rendered impossible or dangerous by a semi- or a wholly comatose condition, or by intractability of the patient, the fluid is given by a stomach tube. By this means the stomach is washed out with three or four pints of hot water; half a pint is left in the stomach, and to this are added, through the tube, two ounces of castor oil and three to four drops of croton oil.

(3) The patient is then at once placed on her side, and, by means of a long tube, first the lower, then the higher, part of the lower bowel is flushed out with soapy water till fæcal matter is no longer returned through the tube. About a pint of saline solution is left in the intestine.

(4) The patient, still on her side, is now covered with warm blankets, while poultices are applied to the loins, special care being taken that the poultices are not too hot, otherwise in the condition of lowered sensibility and vitality peculiar to eclamptics, injurious effects might be produced.

(5) The next detail is directed to the prevention of fluid or foreign bodies entering the trachea, and so causing pulmonary œdema and its sequences. For this purpose the patient must be kept continuously in the lateral position, her head being turned well to the side to facilitate the flow of mucus from the mouth; no gag should be used. Absolutely no nourishment should be given by the mouth.

(6) The next point in the treatment has reference to exceptional conditions: when the pulse becomes feeble and rapid, injections of digitalis should be given, and of atropine when the respiration becomes slow and sighing: in very serious cases saline injections, preceded, perhaps, in cases of plethora, by phlebotomy.

(7) Throughout, there must be no interference with pregnancy or with labour. The only intervention permissible locally (and this only in very exceptional cases) is the application of forceps when the head is at the vulva.

How far the method just described will replace that of immediate evacuation of the uterus in serious cases of eclampsia is a question which cannot meantime be decided. For the general practitioner, at any rate, it possesses two decided advantages: it furnishes a definite line of treatment, which is to be employed in all cases, and which can be put into effect without delay; it avoids local interference and thus diminishes the danger of septic infection to which eclamptic women are so peculiarly liable.

New Books and New Editions

The Theory and Practice of Medicine. By FREDERICK T. ROBERTS, M.D., B.Sc., F.R.C.P. Tenth edition. Two vols. Pp. 1368. London: H. K. Lewis. Price 26s. net.

THESE handy and nicely got up volumes are a worthy monument to the ability and energy of their accomplished author, for he has undertaken and completed the revision, rendered necessary by the great advances of recent years, without any extraneous help. It is no mere *rechauffé* that we have here; the work embodies Dr Roberts's personal experience and opinions in relation to a large number of subjects which he has had special opportunities of studying, as well as a considerable summary of many years' professional and clinical teaching. Many of the articles, such as those on typhoid fever, diphtheria, chronic phthisis, and malaria are exhaustive, and practitioners, of however great experience, will be sure to find much well worth the reading. The style is clear, compact, and yet pleasant; the book is not by any means a cram-book. We do not know of any guide we would sooner recommend to the student. Where a statement is made on other than the personal authority of the writer, this is usually indicated by a phrase such as "it is affirmed." The section on skin diseases, which appeared in former editions, is now omitted, very properly, and even with this gain in space it has been difficult to give more than a very condensed account of certain diseases, particularly, perhaps, in the nervous system. This is no doubt quite unavoidable, so rapid are our gains in knowledge of recent years. In another edition, even the addition of a few pages would be worth while if some more illustrations could be inserted. They would be specially of value in aiding the study of the nervous system; simple diagrams of the neurones, of cerebral centres concerned in speech, vision, etc., of reflex areas, and so forth, save much verbal description. The illustrations given are useful old stagers in the main, such as parasites, urinary crystals, and various forms of cells showing degeneration. There are also a number of pictures of bacteria quite helpful. One printer's error (p. 590) may be noted. The sanatorium of Brehmer at Görbersdorf is changed to that of Bremer at Jöbersdorf.

Each of the volumes is supplied with an index to the whole work, an arrangement which saves much trouble.

Nothnagel's Encyclopedia of Practical Medicine. English Edition. Diseases of the Kidneys and of the Spleen. Hæmorrhagic Diseases. By Dr H. SENATOR and Dr M. LITTEN. Edited with additions by JAMES B. HERRICK, M.D. Pp. 815. Philadelphia and London: W. B. Saunders & Co. 1905. Price 21s.

PROFESSOR SENATOR has so long been recognised as an authority on "Diseases of the Kidneys" that the English reader will welcome this edition of his work. His views have always been characterised by a well-balanced moderation alike of language and of thought. This is well exemplified in the section on the classification of nephritis, a subject which has led to much controversy both from the clinical and pathological standpoints. Senator holds that all hæmatogenous and non-suppurative diseases of the kidneys may be divided into acute nephritis, which includes the parenchymatous and the diffuse; chronic diffuse nephritis without induration; and chronic indurative nephritis, which includes the secondary contracted kidney, the primary indurative or chronic interstitial, and the arterio-sclerotic kidney. On the much discussed question of physiological albuminuria, the author holds that albumin having been proved a common constituent of normal urine—that when very small quantities of albumin are found in an otherwise normal urine of a healthy individual not beyond middle age, and that only at intervals, or after certain definite extraordinary but physiologic causes, it can then be termed physiological. Of physiological causes he mentions severe muscular exertion, an unusually hearty meal, a cold bath, emotional excitement, or mental over-exertion.

The reader is cautioned against regarding all cases of intermittent albuminuria as functional, even in the absence of pronounced signs of disease. The chapter on Uræmia is interesting. The author regards the symptom-complex as an auto-intoxication of nitrogenous substances, dependent on a disturbance of the renal functions, and accompanied by the decomposition of albumin, leading to abnormal acid formation. The functional disturbance probably includes that of an internal secretion, the significance of which is not as yet well known. In the chapter on Displacement of the Kidney, the author's views are so clearly stated and so sound that they must meet with general approval, save from the few extremists who operate indiscriminately in cases of neurasthenia when the right kidney is palpable.

Professor Litten's contribution on "Diseases of the Spleen and Hæmorrhagic Diseases" is a careful encyclopedic account of

our present knowledge of the subject. At times the author leaves one in doubt as to which view he advocates, as, for instance, in his discussion of Morbus Maculosus Werlhofii.

In considering scurvy he inclines to the old view that the disease is due to the absence of fresh vegetables, which seems a doubtful one after the experience of recent Arctic explorations.

The volume, as a whole, is well up to the high standard of *Nothnagel's Cyclopedia*. The editor, Dr Herrick, has done his work well, and his numerous editorial notes add much to the value of the volume and bring the text more fully up to date.

Indigestion—The Diagnosis and Treatment of the Functional Derangements of the Stomach. With an Appendix on the Preparation of Food by Cooking, with especial Reference to its Use in the Treatment of Affections of the Stomach. By GEORGE HERSCHELL, M.D. (Lond.). Third edition. Entirely rewritten. Pp. 293. London: Henry J. Glaisher. 1905.

SPECIALISM demands nowadays a separate treatise almost for each disease, and certainly there is room for one on Indigestion. In it we have the commonest of present-day troubles, and its successful palliation or cure is of primary importance in the work of every medical man. Dr Herschell's book, which gives a clear and distinct account of the functional derangements of the stomach, will supply a necessary demand.

The volume is entirely rewritten and brought up to date from previous editions, and in it we have the latest views on the diagnosis of stomach troubles, and a complete account of the new methods of treatment.

For the vague term "dyspepsia," Dr Herschell has substituted a series of conditions definite and distinct, which he is able to separate and explain by modern methods of diagnosis, and for each describe a particular pathological condition of the stomach which can be practically dealt with.

Chapter iv., on Atony of the Stomach or Gastric Dilatation, is particularly interesting, and it contains a very full account of the nature, symptoms, types, and treatment of this condition. For this common though serious trouble he is hopeful about a cure in all except the worst cases after carefully ascertaining the facts. Drugs are not of much help. Lavage he finds useful, but only if exercised at proper times and in a proper way, according to the stage of the atony.

Electricity helps greatly in the cure of all slight cases in

which there is only a loss of contractility, and he is hopeful of a cure by it in a number of cases where previously only palliation was obtained.

Chapter vi., on Modern Intragastric Methods of Diagnosis, will be found very helpful for a proper understanding of the various functional stomach troubles.

There are 60 pages of an appendix on the Preparation of Food in its Relation to Affections of the Stomach, which contain numerous hints to the many who are often in difficulty over the question of dieting in these cases.

Altogether the volume is one which will readily find its place in a physician's armamentarium.

The "Nauheim" Treatment of Chronic Diseases of the Heart. By LESLIE THORNE THORNE, M.D., B.S. Durham, M.R.C.S.Eng., L.R.C.P.Lond. Second edition. Pp. 75. London: Baillière, Tindall & Cox. 1906. Price 3s. 6d.

THE greater part of this little book consists of a series of excellent figures representing the method of administration of the "Schott" exercises. To those unacquainted with the method it will undoubtedly prove useful.

Sanatoria for Consumptives. By F. RUFENACHT WALTERS, M.D., M.R.C.P. Third edition. Pp. 389. London: Swan, Sonnenschein & Co., Limited. New York: E. P. Dutton & Co. 1905. Price 12s. 6d.

IN his preface to this edition the author states that "this volume is intended as an unofficial directory of existing sanatoria for consumptives." As such it is a work of considerable value, and one which undoubtedly is the result of much laborious investigation and systematic inquiry.

Reference is made to sanatoria all over the world, the points of interest and of more particular value for practitioners being in each instance recorded, while the book is abundantly supplied with excellent illustrations.

In addition to this—the main part of the book—the author incorporates several interesting and instructive chapters on the various methods of treatment, varieties of climate, and kindred subjects. The work is one which is bound to prove of great assistance to practitioners.

The Principles of Bacteriology, a Practical Manual for Students and Physicians. By A. C. ABBOTT, M.D., Professor of Hygiene and Bacteriology, University of Pennsylvania. Seventh edition, enlarged and thoroughly revised. Pp. 689, with 100 illustrations, of which 24 are coloured. London: H. K. Lewis. 1906. Price 12s. 6d.

THIS seventh edition of Dr Abbott's practical manual on Bacteriology maintains the useful characters of previous editions, and has at the same time been much enlarged and revised. The chief addition consists of an interesting chapter on Infection and Immunity. In this the author has traced with descriptive skill the evolution of the different theories advanced to explain immunity, and has set forth the present state of opinion on this very complicated subject. Laboratory procedures are given in detail, and many pathogenic micro-organisms are described and illustrated with good effect. The introduction of the new system of nomenclature is advantageous, but it is recognised that the familiar synonyms are not likely to be discarded and these are also included. There are occasional omissions in the volume which one would not expect, *e.g.* there is no mention by name of the bacillus of Hofmann in connection with the pseudo-diphtheritic bacteria. It is satisfactory to find reference to Knapp's method of distinguishing the members of the diphtheroid group of bacilli, but the author does not state his own opinion as to the universal validity, or otherwise, of the suggested test. A list of materials and apparatus is given in an appendix, and suitably concludes a practical volume on bacteriological work.

A Manual of Clinical Chemistry, Microscopy, and Bacteriology. By Dr M. KLOPSTOCK, and Dr A. KOWARSKY of Berlin. Translated by THEW WRIGHT. Pp. 296. London: Rebman, Limited. 1905.

THE hope expressed by the translator that this book may meet with the same favourable reception as has been accorded to the German edition will, we think, be realised.

As a concise manual of practical medicine it will supply a felt want. Though of relatively small bulk, it is very complete, including, as it does, microscopical and bacteriological, in addition to chemical methods of investigation. For laboratory students who desire to have at hand details for clinical investigation, and for practitioners who must have the quickest

and at the same time most recent chemical and bacteriological methods, it will be found a most useful guide.

Commencing with the mouth and pharynx, a chapter is devoted to the complete examination of the various secretions and excretions of the body. Chapter xii.—the last—deals with the methods of bacteriological examination, formulæ of stains, and culture media. Where all are good, it may not be invidious to pick out Chapters vi. and vii.—the one on the Examination of the Gastric Contents and the other on the Examination of the Fæces—as among the best. The chapter on the Examination of the Fæces is very full and thorough, and indicates a demand for more particular attention to the chemical and bacteriological examination of the fæces in alimentary and other diseases. The method of illustration—by plates at the end of the book—is of questionable benefit. They are more likely to be useful, and more notice is taken of them, when included in the text. Some of the illustrations do not reach the same standard of excellence as the text.

The book is very clearly and intelligibly written, and has lost none of its excellence in translation.

The Principles of Heredity, with some Applications. By G. Archdall Reid, M.B., F.R.S.E. London: Chapman & Hall. 1905. Price 12s. 6d.

In his preface the author says: "In the fifth chapter I have sought to re-establish on a firm basis the doctrine that the development of the individual is a blurred recapitulation of the life history of the race." In that chapter, among other statements, he says that all the inborn characters of an individual take origin from the germ-plasm from which he sprang. They arise because the germ-plasm was so constituted that it tended, under fit conditions of shelter and nutrition, to give rise to an organism having these characters. He goes on to say that the germ-plasm may be so constituted that it tends to give origin to two characters, only one of which will develop, the other becoming dormant or latent. He proceeds in this way for some time, and at p. 105, when speaking of the cause of spontaneous variations, we find: "But if the child recapitulates the development of his parent, there can be no more doubt of the recapitulation of the life history than there can be of the truth of a proposition which has been demonstrated mathematically. The inability of embryologists to trace life-history in the development merely demonstrates the fact that there have been variations in

the past, and that these have been recapitulated. The neglect of the doctrine of recapitulation by students of heredity has led directly to the prevailing disbelief in the adequacy of Natural Selection and to the formation of a number of impossible morphological hypotheses." It is as well, perhaps, that the author has tacked this favourite recapitulation theory of his to the doctrine of Natural Selection, else it might have received little notice. Summing up, he says: "It is as if, standing on a hill and peering into a mist-hidden valley, we put on magic glasses. The mists vanish. Things erstwhile dim and mysterious become in a moment plain and consistent. The great scheme of Nature spreads like a map at our feet." Judging by his book, he hasn't put on the magic glasses. Speaking about the theory of immunity (p. 112), he says: "It follows in the case of disease that selection should cause an evolution of an inborn power of *resisting* infection, or of an inborn power of *recovering* from infection. Thus only inborn immunity, inborn power of *resisting* infection, is of avail against tuberculosis." He gives no idea of how such immunity is brought about. Again, on p. 125 he says: "It is evident, if Ehrlich's hypothesis be correct, that it does not controvert the explanation upheld by the present writer. It merely attempts to go much deeper. For digestion by enzymes it substitutes naturalisation with subsequent digestion. It explains 'habituation' by supposing that the cells acquire the power of producing side-chains in greater abundance. But the central mystery as to how this power arises remains unexplained." Ehrlich has tried to solve this mystery by dint of hard experimental work, a method that the author doesn't seem to have adopted. He continues: "Contrast Ehrlich's hypothesis with the simple explanation of immunity set forth in the present work. . . . It supposes that inborn *racial* immunity is not due as a rule to any special resisting power on the part of the attacking species, but to the lack of adaptation to that particular environment on the part of the attacking micro-organisms; that the inborn immunity occasionally displayed by certain individuals of a susceptible race (*e.g.* man in the case of scarlet fever) is due to a resisting power so high that the disease germs are unable to establish themselves under normal conditions of health; that . . ." and so on. But what that resisting power is, how the general power of making useful acquirements in particular directions is obtained, he does not say. In his book there is much quotation, we might almost say verbiage, but of experiment and hypothesis founded on that, none. He is not unconscious of this, for (p. 167) he says: "Many readers have found the foregoing discussion on the causes of variation very tedious. But the

subject is of surpassing importance. Except we have clear and correct ideas concerning it we must go astray in our whole conception of life." We fear that the author's ideas are not any clearer than they should be, and the conclusion is forced on us that he has undertaken a task beyond his powers. In his chapter on Narcotics he is more at home, though here also some of his statements sound a little strange. On p. 204 he says: "The English consume three-quarters of their alcohol as beer and less than one quarter as spirits. They are much more drunken than South Europeans, whose beverage is, on the average, twice as strong." What is the beverage? The café frequenter of Athens often contents himself with a little mastic, the Italian with a moderate quantity of chianti, often what he purchases for a penny, and the Frenchman's vin ordinaire is not very heady. Where is the beverage which is twice as strong, say, as Scotch whisky? From these subjects he proceeds to discuss reflex action, voluntary action, automatic action, the mind of man, racial mental differences, methods of religious teaching, of scholastic teaching, and finishes with a chapter on Practical Problems. "It must be remembered," he says, "how greatly Darwin benefited thought and knowledge by calling the attention of men of science from the exclusive study of the individual to the scrutiny of the race. A similar work awaits medical men. Owing to improvements in medical science and the consequent survival of the hitherto unfit, tremendous problems have arisen, the solution of which cannot long be delayed without disaster to the species." Let the author try his hand at solving one of these practical problems; he will find it an infinitely more difficult task than merely writing about it.

Sex and Character. By OTTO WEININGER. Authorised translation from the sixth German edition. Pp. 356. London: William Heinemann. 1906. Price 17s. net.

THE conscientious reader who begins the study of this book by a perusal of the prefatory extracts from German reviews, and of the publisher's introductory note, will proceed to an examination of the work itself with considerable anticipation. One of the reviews speaks of the work as "an extraordinary book, that called forth the learned criticism of two faculties, and appeared in a third edition a few months after its publication." The publisher—we presume the English publisher, though this is not stated—declares that "there is perhaps in all history no other instance of a man who has produced a work so mature in

its scientific character, and so original in its philosophical aspect, as 'Sex and Character,' when he was no more than twenty-one years old. . . . 'Sex and Character' is undoubtedly one of those rare books that will be studied long after its own times, and whose influence will not pass away, but will penetrate deeper and deeper, compelling amazement and inviting reflection in steady expanding circles."

That is saying a good deal, but not one word too much—if only the author's contentions are true. For what do we find? Nothing less than that, for the first time in human history, woman has been thoroughly comprehended by a man, by a young man of twenty-one, who, we regret to learn, has since died by his own hand at the age of twenty-three. "The woman as the Sphinx!" says the author. "Never was a more ridiculous, a more audacious fraud perpetrated. Man is infinitely more mysterious, incomparably more complicated.

"It is only necessary to look at the faces of women one passes in the streets. There is scarcely one whose expression could not be at once summed up. The register of women's feelings and disposition is so terribly poor, whereas men's countenances can scarcely be read after long and earnest scrutiny."

The first part of the work is devoted to the working out of a rather interesting theory. According to the author, all men are partly female, and all women are partly male. This is indicated, for example, by the possession of mammary glands by the male, but it applies to all the bodily and mental characters. We may imagine an ideal man, M, and an ideal woman, W, as sexual types, but these do not really exist. All existing men and women are intermediate types. The most manly man is not pure M. The most womanly woman approximates to, but is not, pure W.

On this basis the author builds his theory of sexual attraction. This is stated thus: "For true sexual union it is necessary that there come together a complete male (M), and a complete female (F), even although in different cases the M and F are distributed between the two individuals in different proportions." That is to say, the more manly a man is, the more womanly will be the women who attract him, while mannish women have a strong preference for womanish men or even for other women.

This theory and its implications are worked out in considerable detail, and the chapters devoted to it form the most interesting and suggestive part of the book.

The rest of the book, devoted largely to a study of female psychology, is really too amazing. Mahomet, it is well known,

excluded women from Paradise, and Tertullian and Origen had a very low opinion of women. Our author, who understands women so thoroughly, shows clearly that these great men were only too well justified in their prejudices. In the chapter on Male and Female Psychology we learn not only that there has never been a female genius (not even among the great masculine women of history), but that there never can be one. "A female genius is a contradiction in terms, for genius is simply intensified, perfectly developed, universally conscious maleness." Woman, also, is non-moral. "It is almost characteristic of a woman that she cannot believe that she has done wrong." She is without sympathy. She has no modesty, no ego, no free-will. In the chapter on the Nature of Woman we learn that "the further we go in the analysis of woman's claim to esteem, the more we must deny her of what is lofty and noble, great and beautiful."

The author admits, indeed, that though woman has no love of truth, there are plenty of women who would not tell a lie for anything. But the popular estimate of idealised womanhood is due to the fact that woman, having no standards of her own, adopts those of men. "As a rule the woman adapts herself to the man, his views become hers, his likes and dislikes are shared by her, every word he says is an incentive to her." She "acquires a second nature without even guessing that it is not her real one; she takes herself seriously, believes that she is something, and that she believes in something; she is convinced of the sincerity and originality of her moralisings and opinions; the lie is as deeply rooted as that; it is organic."

As to the relation which should exist between men and women, the author apparently agrees with St Augustine in advocating continence for all mankind. As to the objection that in this case the whole human race would quickly disappear from the earth, he exclaims:—

"This extraordinary apprehension, the worst part of which appears to be the thought that the race would be exterminated, shows not only the greatest unbelief in individual immortality and eternal life for moral well-doers; it is not only most irreligious, but it proves at the same time the cowardice of man and his incapacity to live an individual life. To anyone who thinks thus, the earth can only mean the turmoil and press of those on it; death must seem less terrible to man than isolation. If the immortal, moral part of his personality were really vigorous, he would have the courage to look the result in the face; he would not fear the death of the body, nor attempt to substitute the miserable certainty of the continuance of the race for his lack of faith in the eternal life of the soul."

We fear we can enter upon no detailed criticism of this work. We have tried to state fairly, if briefly, some of the positions taken up by the author, and we have quoted the publisher's extraordinary eulogy; but for our own part we must confess that we feel that if the book is a surprising one to come from the pen of so young a man, no one but a young man could have had the confidence or courage to write it. We doubt not that if the unhappy author had lived he would have understood women less at thirty than he did at twenty-one. As to the value of the book, we think we shall not be doing it less than justice if we place it somewhere in the neighbourhood of a book much talked of a few years ago—the work of Max Nordau, entitled *Degeneration.*

Anæsthesia in Dental Surgery. By THOMAS D. LUKE, M.B., F.R.C.S.Ed., Lecturer on Anæsthetics, Edinburgh University; Anæsthetist to the Dental Hospital, the Deaconess Hospital; and Instructor in Anæsthetics, Royal Infirmary, Edinburgh. Second edition. Pp. viii. + 211, with twenty-nine Illustrations. London and New York: Rebman Limited. 1906. Price 6s. net.

THIS edition is in many respects an improvement on its predecessor of two years ago. The subject matter has been extended by about sixty pages, and the appearance of the book is pleasing, though some of the illustrations are hardly a credit to the publisher.

We note with satisfaction that the consideration of chloroform as an anæsthetic in dental surgery has been relegated to an appendix, and we hope that in the next edition it will not be considered necessary to include it within the covers at all.

So long as the author confines himself to the consideration of anæsthesia we have no special criticism to offer, although we might differ in matters of detail, but sundry excursions into the realms of anatomy and of dental surgery might as well have been omitted.

In view of a third edition, we would make a few practical suggestions for the consideration of the author. Firstly, we have obtained far better results in the administration of "gas and ether" by using a one-gallon bag, than by using a three-gallon one, which we once used, and which is still recommended by Dr Luke. Page 108—a still more convenient ether bottle is an eight-ounce stoppered one in which a good cork replaces the glass stopper, and the side of the bottle is graduated in ounces.

Page 132—the directions for making up a 2 per cent. solution are not informing; were the reader told that 4.5 grains or minims to 1 ounce make, for all practical purposes, a 1 per cent. solution, he would have something tangible to work on.

In the chapter on the Accidents of Anæsthesia, the omission of Professor Schäfer's method of restoring respiration is unfortunate, for it entails exactly the best position for the escape of blood, mucus, and foreign bodies from the mouth and air passages, whilst it allows the tongue to fall forward: all points of great consideration if the accident occur after the operation has been commenced.

But withal the book should be of great value to the dental surgeon and to the medical man who administers anæsthetics for him, and it is with the desire of rendering the book still more useful that we offer these criticisms.

Lectures upon the Nursing of Infectious Diseases. By T. J. WOOLLACOTT, M.A., M.D. Oxon. Pp. vii. + 147. London: The Scientific Press, Limited.

DR WOOLLACOTT has succeeded in producing a handbook which will be of great service to all nurses, and will be found especially useful by those who have not had the advantage of fever training. It is clearly and simply written, and will be readily understood by those for whom it is designed, a merit which such handbooks do not always possess. An account is given of each infectious disease, and the details of treatment and nursing are carefully described. Dr Woollacott very properly says in his preface that, while it is not the duty of a nurse to originate treatment, still she should be sufficiently well informed to prepare for the instructions which she is likely to receive. The chapter on Diphtheritic Croup appears to us to be particularly good, and there are many valuable hints on the nursing of cases of tracheotomy. Very good also is the chapter on the General Management of Infectious Disease. The course of enteric fever is well described, and due stress is laid on the importance of the nurse promptly reporting any symptoms which might suggest that perforation has occurred. A summary of a nurse's duties in enteric fever concludes this chapter, and it is admirably concise and simple. The book, while it gives all that a nurse can possibly require to know, does nothing to suggest that medical advice is to be disregarded, and we think that most medical men will appreciate the services of a nurse who has assimilated its contents.

Lectures to Teachers on the Prevention of Infectious Diseases. By WILLIAM BERRY, F.R.C.S.I., D.P.H., Medical Officer of Health, County Borough of Wigan. Pp. 64. Bristol: John Wright & Company. 1906. Price 6d.

THIS contains a résumé of five lectures which the author delivered to school teachers at the request of the Educational Committee of the Wigan County Borough Council.

The first lecture deals generally with Infection. The next two lectures contain brief accounts of the Commoner Infectious Diseases, with special reference to their early diagnosis, this naturally being the chief object of the course. The third lecture treats of Infective Skin Diseases, and the concluding one contains a sufficiently adequate description of Disinfection and the usual Disinfectants.

The booklet is clearly and succinctly written, and will prove most useful to the class for whom it was designed.

Errors of Refraction and their Treatment. By CHARLES BLAIR, M.D. Bristol: John Wright & Co. 1905.

IN the space of 100 pages the author of this small book certainly justifies his intention in writing it, which in his preface he describes as an "endeavour to supply in a condensed form the more practical and clinical points in connection with errors of refraction."

Perhaps the arrangement of the chapters might with advantage have been a little different, and a few outlined figures would certainly have more than compensated for the additional space required. Though this book is very small, it suffers comparatively little from defects often present in such books. The information given is of the most essential and necessary kind for the student. The ground has been very often covered before, but the facts are lucidly and concisely stated.

Notes on General Practice. By S. M. HEBBELTHWAITE, M.D. Lond., etc. Pp. 78. London: The Scientific Press, Ltd. Price 3s. 6d. net.

THE object of this book is stated to be threefold, viz. to guard the practitioner against mistakes; to enable men to revise their knowledge before going into practice; and to put together

information which the author hopes may be useful. The first object has the greatest prominence given to it. The author graphically describes some of the mistakes and difficulties which have come under his observation, and indicates the means of avoiding or of overcoming them. If practitioners could bear these in memory they might be saved from some bitter experiences. Probably, however, as the author points out, more mistakes arise from want of care than from want of knowledge. In the chapter on Obstetric Notes, reference is made to certain handbooks for fuller information; and in the earlier part of the book the author's object would probably have been better attained had he followed a similar course with reference to Clinical Diagnosis instead of entering into detail. When he deals with treatment he makes an opening for difference of opinion, *e.g.* in relation to the treatment of gastric ulcer (p. 21). He does not disapprove of feeding-bottles with long tube under certain conditions, but these are practically unattainable. The book is well worth perusal.

First Aid to the Injured and Sick: An Advanced Ambulance Handbook by F. J. WARWICK, B.A., M.B. Cantab., M.R.C.S., L.S.A.; late Capt. R.A.M.C. (Vols.), and A. C. TUNSTALL, M.D., F.R.C.S.Ed., Capt. commanding City of London Volunteer Infantry Brigade Bearer Coy. Fourth edition. Pp. 224, with 219 illustrations. Bristol: John Wright & Co. London: Simpkin, Marshall & Co., Ltd. 1906. Price 1s.

THE fourth edition of this popular work, revised up to date and well written, is unlike many ambulance books in that it begins with a short, clear account of the microscopic construction of the human body. The anatomical part of the work is fully given and quite readable by an ambulance pupil.

The chief features of the work are its profuse and carefully-chosen illustrations, which materially help the student in understanding and remembering what he reads.

The section on Bandaging is exceptionally good, though ambulance pupils are not expected to grasp the many fine points in the application of the roller bandage.

Though the tabular classification on the subject of Poisons looks somewhat formidable, it will be found to contain many important facts well worth remembering.

In the transport of sick and wounded many valuable hints are shortly given.

Chapter xix., on preparation for the reception of a case of accident or sudden illness, is quite a good idea; many otherwise good ambulance books seem to overlook the necessity of an ambulance pupil being competent to attend to the patient's comfort and safety until he is finally put to bed and the doctor's visit prepared for.

The book may be heartily recommended to ambulance men who are desirous of getting a clear grip of their work.

The Cleansing, Disinfection, and Protection of the Hands. By Dr CARL S. HAEGLER, ao. Professor of Surgery in the University of Basel. Translated by CHARLES HERON WATSON, M.A., M.B., F.R.C.S.Edin. Edinburgh and London: William Green & Sons, 1906. Price 6s. net.

THOUGH somewhat belated, for it is now six years since the original edition of this work, the appearance of a translation of Professor Haegler's standard treatise is none the less welcome, more especially as the author in a special preface states that he has seen no occasion to alter the views then expressed. In a country where there is so little modern literature of value on this subject, it was high time that this exposition of some twelve years' research should be available to English readers, and the translator is to be congratulated on having made it so.

It is impossible to consider in detail the enormous field of investigation, often on very controversial matters, covered by this book; one might only observe in passing that Professor Haegler is perhaps inclined to pay too little attention to the question of the pathogenicity of the normal skin epiphytes. The book demands the careful study of all engaged in surgical work; the chapter on Prophylaxis deserving special attention. The value of the English translation has been enhanced by the addition of a new preface in which the writer describes his present methods of procedure, and of a bibliography of the more recent literature on the subject, which is on the whole fairly comprehensive. The translation has been carefully carried out, and any errors are merely typographical and unimportant.

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THE SCOTTISH
MEDICAL AND SURGICAL
JOURNAL

VALEDICTORY ADDRESS

Delivered to the Edinburgh Obstetrical Society

By N. T. BREWIS, F.R.C.S.,
Gynæcologist, Royal Infirmary, Edinburgh

LADIES AND GENTLEMEN, Fellows of the Edinburgh Obstetrical Society,—No one ever entered on the high and responsible duties of the office of President of this venerable Society with such a complete sense of inadequateness as I did two years ago. True, I felt encouraged by the hearty send-off which my genial and accomplished predecessor gave me, and also by the deep sense I had of your kindness; still I could not but feel that I was undertaking duties which might prove too high for me. In glancing back I congratulate myself that my term has passed pleasantly and profitably, and for being able to make this happy reflection, I am, in the first instance, indebted to the Society for its indulgent forbearance with all my shortcomings, and secondly, to the able assistance and wise deliberation of the Council in all matters concerning the Society's welfare. I feel that we owe a special debt of gratitude to the active and courteous gentlemen who have filled the Secretariat, and to them I tender the thanks of the Society. Much of the success of the Society depends on their activity, and we have been fortunate in having our work so well arranged and so successfully carried out by Drs Fordyce, Lamond Lackie, and Barbour Simpson. By their foresight, their knowledge of the affairs of the Society, and their unvarying courtesy, all the work has been accomplished with smoothness, regularity, and

the utmost pleasantness. Personally, my indebtedness to these gentlemen is very great, and the very agreeable relations which have existed between them and the Chair will always be to me a delightful memory. Additional thanks are due to Dr Lackie for the highly successful manner in which he has performed his duties as Editor of the *Transactions*: only those who have had experience in the work know how onerous it is, and Dr Lackie deserves not only our thanks, but merits our congratulations on the prompt and efficient manner in which he has executed these duties.

But while we are justly entitled to congratulate ourselves on the success which is attached to the literary side of our proceedings, we must not forget how much the prosperity of our Society is due to the masterly way in which our financial affairs are managed. For a great number of years this department has had the advantage of being under the care of one who combines great geniality of disposition with exact business principles, and under whose guidance the prosperity of the Society has become sufficiently evident to attract the attention of the Income-Tax authorities. Dr Craig's excellent work and his unvarying kindliness ensure him the warmest regard of the Society.

Further evidence of the Society's progress is manifested by the additions which are yearly made to our roll of membership. During the last two years there has been an accession of thirty-seven Ordinary Fellows. The addition of every new Fellow adds to the importance of the Society; it signifies that there is one more professional brother to interest and to teach. It behoves us, therefore, ever to keep in mind the responsibility of the Society to throw new light over the field in which we work, and through our *Transactions* to spread new truths, in the first place, to our own Fellows, and secondly, to the medical world at large.

We cannot, however, contemplate the increased growth in our membership, and of our sphere of usefulness, without at the same time grieving that the Society has in the same period of time had removed from its roll several distinguished and respected members. The death roll during my term of office numbers one Honorary, two Corresponding, and ten Ordinary Fellows.

Dr G. S. Engelmann, of Boston, U.S.A., was elected an Honorary Fellow of our Society in July 1903, and he died suddenly on November 17, 1903, at the comparatively early age of fifty-five. He was a graduate of Washington University and of Berlin, and was one of the most highly respected obstetricians in the United States. He is widely known as the author of many valuable contributions to the literature of his specialty, and also as one who took an active interest in the International Congress of Obstetrics and Gynæcology.

From our roll of Corresponding Fellows we miss the name of the venerable and highly esteemed *Dr Samuel Lawrence*, of Montrose, who died at the advanced age of eighty-eight. He became a licentiate of the Royal College of Surgeons in 1835, *i.e.* seventy years ago. In 1863 he gave a contribution, which was published in the *Edinburgh Medical Journal*, entitled "Statistical Report of 1000 Midwifery Cases"; in 1885 he published a paper on "Podalic Version, its Place in Obstetrics"; and in the third volume of our *Transactions* there appears a contribution from him read before our Society on February 14, 1872, on "A Case of Large Congenital Cranial Tumour." He was elected a Corresponding Fellow of our Society in 1849, and at the time of his death was the third oldest Fellow on our roll, Dr A. Peddie and Dr George Keith being his seniors.

The greatest blow which our Society has suffered for years occurred when *Milne Murray* was taken from us. His untimely death leaves a blank which all those who knew him well feel can never be filled. The sad circumstances attending his long illness are fresh in your memories, and it would ill become me to recall them. Nor can I trust myself to attempt with my pen to add anything to what has already been said with such befitting grace by Professor Simpson. His work, his brilliant talents, his genuine originality, his fortitude, the beauty of his character, and the greatness of his heart, we enjoyed and admired whilst he lived amongst us, and now that he is gone the remembrance of them will be cherished by us as long as life lasts.

In the death of *Dr Peter Young* we lost one who took an active share in the work of the Society. He was admitted a Fellow in 1859. Two years later he was appointed one of the

secretaries; in 1876 he was elected vice-president, and at a later period he acted as librarian for a term of six years. His communications on "Vaginal Enterocele," "Gravidatas Serotina et Præcox," "Dangerous Hæmorrhage from the External Genital Organs during and after Labour," "Pulmonary Thrombosis in a Puerpera," are all well-written papers of much clinical interest. He carried on a large general practice, and for years lectured on Midwifery and Diseases of Women in the Edinburgh Medical School.

We have now to place on record the removal by death from our roll of six Fellows who though, with one exception, were not active participators in the affairs of the Society, were men who from their intrinsic worth we were proud to consider our Fellows. They were, one and all, men who lived and laboured ably, faithfully, and unselfishly in their own sphere, getting their chief recompense from the satisfaction which work well done brings, and from the love and trust which they won from those they strove to serve.

Dr Alexander Matthew, of Corstorphine, was a conspicuous example of such a type of man. He has been described as a most friendly, courteous, unselfish, hard-worked, and highly valued medical man, and those who had the privilege of his friendship knew how true an estimate this is of him.

Dr Robert Somerville, of Galashiels, was a most genial and lovable man, with a fine sense of humour and a highly cultured mind. The charming presidential address which he a short time ago delivered to the Harveian Society, in which he gave a delightful appreciation of the giants of his student days—Goodsir, Syme, Simpson, and Bennet—is fresh in the recollection of most of us. He was intensely interested in everything pertaining to the profession of teaching, and he was never more happy than when giving reminiscences of his old teachers. He was chairman of the School Board of Galashiels for years, and spent an immense amount of time and energy in the cause of education in that town, and his exertions were much appreciated by the community. In everything concerning the public welfare of Galashiels he took an active interest; in the erection of the Public Library and in the establishment and administration of the Cottage Hospital he was the leading spirit, and in his latest years he was engaged in a scheme for providing a

public institution for the treatment of consumption. He was president of the Border Branch of the British Medical Association, and represented it on the Council from 1893 to 1903. To the Society's *Transactions* he contributed one paper, entitled "Two Cases of Puerperal Hæmatocele." At the time of his death he was in his seventieth year, and was the oldest practitioner in Galashiels.

Dr Robert Lucas, of Dalkeith, died in October last in his fifty-ninth year. By the integrity of his character and the faithfulness of his life work he worthily upheld the dignity and usefulness of his profession. He had distinct gifts of head and of heart, which gave to his personality an abiding interest and charm. Like Dr Somerville he was prominent as a public man, and was ever ready to take his share in any movement that was for the benefit of his town and the highest interest of his fellows. His connection with the Militia was long and honourable, and he had reached the rank of Surgeon-Lieutenant-Colonel when he died. He was a member of the School Board of Dalkeith for many years, and occupied the Provost's chair for a term of office. He died in the very midst of activity and usefulness, and was mourned by the whole community of the district in which he practised.

Dr James Jamieson, who died on the 3rd of last November at the age af 64, joined the Society in 1866. In the early volumes of the *Transactions* his name frequently appears as a partaker in the discussions, and in 1872 he was the contributor of a paper on "A Case of Vaginal Rupture." He served on the Council, and from 1875 to 1879 he acted as our first librarian. In the midst of hard professional work he found time to read widely and to keep abreast of the times. He was a man of much geniality, was most methodical in all his ways, and had a great love of order. He was a warm advocate of ether as an anæsthetic, and invented a special apparatus for its administration. Among his many kindly traits was one which showed his great sympathy for the afflicted, in that he regularly devoted part of his time to the benevolent work of reading to the blind.

Dr Alexander Black joined the Society in 1881. He was a man of humane and generous impulses, whose simplicity of character, racy good humour, fine literary and artistic tastes,

were severe eclamptic cases ; Bozzi's dilator was used with the object of obtaining rapid delivery, and Dr Ballantyne is to be congratulated in saving all the mothers and two of the children, the third child being non-viable.

Sir Halliday Croom, in his extremely instructive paper, records two cases of Cæsarean section for eclampsia, in which he considered that they offered no alternative to the treatment which he adopted. In Case No. 1, the vagina was very narrow and of extremely small capacity. The patient was a primipara, aged 20. The cervix was thick, dense, and hypertrophic, and was absolutely undilatable by finger or instrument. (Bozzi's instrument was unknown at the time.) The case was a severe one and the patient's condition critical, and immediate delivery offered the only chance to the life of mother and child. Porro Cæsarean section was performed, and the patient died six hours afterwards from an eclamptic seizure. The kidneys were extracted, and showed extreme cloudy swelling and early catarrhal nephritis.

Case No. 2 occurred in a primipara, aged 46, and was also one of severe eclampsia. The cervix was enormously thickened and hypertrophied, and the pelvis was contracted to the first degree. Dilatation of the cervix was abandoned chiefly for want of time, and Cæsarean section was performed. The child was saved, but the mother died on the third day. One feels tempted to draw conclusions from the series of cases I have just read of the relative merits of the three operations, but, in my opinion, such would be of little value, as every case differs in some respect and is a law to itself.

The new operation of Hebotomy, or lateral section of the pubes, recently introduced by Gigli for the same grades of pelvic deformity to which symphysiotomy is applicable, and incurring less risk from laceration and hæmorrhage, was performed for the first time in this country by Dr Berry Hart; and though the operation in this instance was not followed by the recovery of the patient, the case selected, and the satisfactory manner in which the operation was performed, led one to hope that it will become recognised in the future as a useful and correct procedure in properly selected cases.

Professor Jardine, in a very able and useful contribution, gave us clinical notes of twenty-eight cases of obstructed labour

occurring during six months that he was on duty in the Glasgow Maternity Hospital. There were eight cases of induction of labour, all performed in the interests of the child, and Dr Jardine, in his comments, in contrasting the operation with symphysiotomy and Cæsarean section, maintains that it gave a smaller maternal mortality than either of these operations, and that it is a perfectly justifiable operation in properly selected cases, especially in the hands of general practitioners who are not experienced in the major operations of symphysiotomy or Cæsarean section.

Of the operation of symphysiotomy, of which Dr Jardine gave four examples, he is not greatly enamoured. He points out that the hæmorrhage, and the almost inevitable laceration of the soft parts, and the difficult after-treatment, are serious drawbacks to the operation.

The cases of Cæsarean section recorded are ten in number. One was performed for inoperable cancer of the cervix, and the remainder for contracted pelvis. All the mothers were saved. This is a record of which Dr Jardine may be justly proud, and entitles him to the heartiest congratulations of the Society.

Any device which makes for asepsis in midwifery practice is worthy of approbation, and, therefore, I think Dr J. W. Ballantyne's effort to produce, in the form of an obstetric satchel, an apparatus which will ensure asepsis in the armamentarium required at labour, is a step in the right direction. I take it that it is the ideal of the accoucheur to have all labour conducted with as complete asepsis as obtains at a surgical operation. The difficulties of obtaining this perfection are so great that it behoves the obstetrician to make sure that any hindrance to attain the ideal is not his fault. And when women recognise that every practitioner is in earnest on this point, they will realise that it must surely be to their advantage to have their confinements conducted under conditions of strict cleanliness. It is then they will come forward and do all in their power to assist the medical man to attain his ideal.

I am sure the Council is to be congratulated on the subject which was selected for discussion in conjunction with the Glasgow Obstetrical and Gynæcological Society in the Summer

Meeting. The meeting was numerously attended, and it was gratifying to note that not only was our sister Society well represented, but that a number of our country members—men whose views and experiences the Society was anxious to get—came and took part in the discussions. The meeting was a most enjoyable one, not only because of the deeply interesting and significant nature of the subject—a subject about which many obstetricians hold views of their own—but also for the re-union of friends which the meeting occasioned. It was a matter of some regret, however, that for want of time a number of members, who desired to take part in the discussion, were debarred from doing so. This limited time has, at most of our summer meetings, hurried and curtailed debate, and I think it would be well if, in the future, arrangements could be made to have rather longer meetings.

If the subject chosen for discussion, "The Use and Abuse of Midwifery Forceps," was a happy one, the Council's selection of the introducer was equally happy. I feel certain the theme could not have been handled with better judgment or greater eloquence than it was by Professor Kynoch.

At the opening meeting of the last session, Dr Ballantyne described how he successfully treated an after-coming hydrocephalic head by spinal paracentesis, and at the same meeting Dr Ranken Lyle gave an interesting description of a rare case of Cæsarean section at term in a patient who had two uteri and two vaginæ. A myomatous tumour grew in one uterus, and was so firmly impacted in the pelvis as to necessitate delivery of the child from the other uterus by Cæsarean section. On the successful management of such a case Dr Lyle well merits our congratulations.

Later in the session Dr Ballantyne described a case of severe eclampsia in which lumbar puncture was performed. He considers it may find a sphere of usefulness in those cases of eclampsia in which the chief therapeutic indication is to control the convulsions, so as to gain time for the application of other methods.

Decapsulation of the kidney as practised by Edebolds of New York was incidentally mentioned, and in the discussion, splitting of the kidney was suggested as worthy of trial in severe eclamptic cases.

The contribution of "Germ Content of the Uterus and Vagina during the Normal Puerperium," written by Dr Brownlee of Stockton-on-Tees, and read by Dr Buist, was one which the Society was very glad to receive. In it Dr Brownlee gave a review of the results and opinions of various writers, and added a series of observations conducted by himself in twenty normal puerperal women. The conclusions he arrived at were :—

1. That the genital passages of women are normally free from pyogenic cocci, which may cause puerperal septicæmia.

2. The same cannot be said regarding organisms ærobic and anærobic, which, while not actually pyogenic, may yet be capable of causing the slighter fevers of the puerperium.

3. That gonococci may be found in the puerperal uterus, even in cases running an apparently normal course.

4. That antiseptic douching before, during, and after labour is to be considered in all ordinary cases not only unnecessary, but actually dangerous.

The first gynæcological contribution given during my term of office was a paper of high scientific interest, and of much practical value, by Dr Scott Carmichael. From it I am sure we all learned much. He showed that leucocytosis taken in conjunction with other signs and symptoms is a valuable aid to diagnosis in cases where the surgeon is in doubt, and where it may be his interference is of momentous importance to the patient. I think he convinced us that every surgeon in a doubtful abdominal or pelvic condition has failed to make a thorough examination of his patient if he omit the leucocyte count.

Among other points brought out in this paper, we learn that in acute inflammatory cases a persistent leucocyte count of 20,000 usually means suppuration. We also learn that the leucocytosis is proportionate to the virulence of the infection and the resistance of the individual. That, for instance, when the patient is overwhelmed with toxines, the tissues fail to react and leucocytosis fails to appear, and under these conditions it would be folly to operate. On the other hand, sepsis with hyperleucocytosis often means a favourable progress, and indicates the exact time for surgical interference. Dr Carmichael shows also that leucocytosis is of great value in determining the micro-organism of suppuration in tubal affections. To

know beforehand whether pyosalpinx is streptococcal, gonococcal, or tuberculous, is of such importance to the surgeon in guiding him as to his method of operating that, if the information that leucocytosis gives us in differentiating these conditions is found to be reliable, then I consider it to be one of the most valuable advances which has been made recently in the interests of gynæcological science and practice. It has been found that streptococcal pyosalpinx gives a high degree of leucocytosis which would lead the surgeon to exercise the greatest care in dealing with the swelling. In such a case, Dr Carmichael recommends that he should operate *per vaginam*. Tuberculous pus causes no leucocytosis, and gonorrhœal causes but slight increase of white cells, and surgeons would in these cases operate with more freedom by the abdominal route.

In Vol. I. of our *Transactions* a paper appeared on "Pessaries," by the late Dr Keiller. Since then only one paper on the subject has been presented until last winter, when our Hon. Fellow, Dr Granville Bantock, gave one entitled "In Defence of the Pessary." The presence of one of our Hon. Fellows made the occasion one of unusual interest. The paper was read before a full house, and the subject evoked a lengthy discussion. Such a meeting showed us the expediency of occasionally having papers on minor ailments which can be discussed not only by the specialist, but by the practitioner.

The Society is to be congratulated in having in its *Transactions* an article of such outstanding excellence as the one presented by Dr Haultain, entitled "A Clinical and Pathological Analysis of a Successive Series of 120 Abdominal Hysterectomies for Fibro-myomata." The paper is one of the ablest that has been written on the subject, and the information it contains clinically and pathologically will be found of the greatest value to tyro and experienced alike, from the incontrovertible array of facts and sound conclusions which the author has given us. From the technical standpoint also the contribution is of the highest worth, as giving the more important methods of detail of an operator whose success is surpassed by none.

It was to be expected that sooner or later the condition of the blood-vessels themselves should come to be investigated in cases of bleeding from the uterus, and in Dr Barbour's well-

written paper entitled "Climacteric Hæmorrhage due to Sclerosis of the Uterine Vessels," he gave a contribution of much value in showing that hæmorrhage from the uterus can be caused solely from the affection of those vessels without the disease being present elsewhere. The paper is valuable in helping us to clear up some difficult not-to-be-explained bleedings at the menopause.

Dr Barbour Simpson gave us a clear and excellent description of a rare case of complete prolapsus uteri which was irreducible and which terminated fatally, not from the displacement, but from the purulent peritonitis which was associated with it.

Dr Haultain, in a valuable paper on "Malignant Uterine Complications of Fibro-myomata of the Uterus," demonstrated clearly and conclusively the relationship of malignant disease to fibro-myomata. He proved that the two conditions have an almost entirely independent origin, and but slightly affect one another; that fibroids may occasionally undergo sarcomatous degeneration, that they in no way influence the development of cervical cancer, and that they but slightly predispose to the development of malignant disease in the body of the uterus.

Professor Simpson brought forward the interesting question of heredity in ovarian cystoma in a paper in which he described three cases operated on by him on members of one family, the mother and two daughters, in which he supported his claim that there are many cases of heredity in ovarian disease.

Dr Malcolm Campbell, in his tentative and suggestive research on "Pathological Condition of the Ovaries as a Possible Factor in the Etiology of Uterine Fibroids," gives the results of his observations on ovaries which were associated with fibroid tumours. He found that in these ovaries the function of ovulation was in abeyance, and that retrograde pathological processes were going on in connection with the Graafian follicles and corpora lutea. He drew an interesting parallel between the ovary of pregnancy and the ovary associated with fibroids, and enunciated the interesting suggestion that as in one the increasing ovarian internal secretion leads to the uniform and symmetrical hyperplasia of the uterus, so in the

other the pathological internal secretion may lead to an asymmetrical and irregular hyperplasia of the tissues of the uterine wall. The impossibility, at present, of formulating a definite theory, he points out, is due to our ignorance as to whether the ovarian changes are primary and causative, or secondary, the result of the presence of the uterine fibroid.

In Sir Halliday Croom's paper entitled "Curiosities of Curetting specially with regard to Cancer," he discussed the difficulties in regard to the diagnosis of cancer, dealing first with the difficulty of its early recognition, and emphasising the heavy responsibility of the family physician in recognising the early symptoms and in indicating to the patient the appropriate treatment. He then narrated a series of most instructive cases, illustrating the importance to be attached to early hæmorrhage and to early curetting and to microscopic examination of the tissues removed. He commented on the difficulty of distinguishing microscopically between cases of cancer and of the products of pregnancy. Among the curiosities of curetting he includes a case of acquired atresia following the operation, a case of perforation, and finally he narrates two cases of patients aged 25 and 40 respectively, who since the operation have ceased to menstruate and have remained sterile.

Dr Haultain, in an important contribution, gave us a series of cases of axial-rotation in its relation to the pelvic generative organs, and in illustration narrated four interesting cases, one of them being an instance of the extremely rare condition of acute strangulation caused by axial-rotation of the uterus. He discussed the differential diagnosis, and pointed out that symptoms of acute strangulation may be simulated by intracystic hæmorrhage and by threatened tubal abortion. He cites a case in which the latter condition was diagnosed, but disproved by abdominal section, when a small twisted ovarian tumour was found with a ruptured vein in the pampiniform plexus.

Dr Freeland Barbour described a case of the rare condition of sarcoma of the cervix, and on the same evening gave an extremely valuable communication on endothelioma of the ovary, based on the microscopical examination of two tumours which he had removed from the same patient. In the microscopical sections which he exhibited he was able to trace step

by step the development of the sarcomatous cells from the endothelium of the lymphatics.

Table of Specimens Exhibited.

Uterine Specimens.

Simple—Fibroids, 43 (2 with calcareous degeneration).
Fibrocystic tumours, 3.
Double uterus, 1.
Uterus removed for bleeding, 1.
Myxoma uteri, 1.
Malignant—Cancer of body, 6.
Cancer of cervix, 6.
Sarcoma of uterus, 4.
Adenoma malignum, 1.
Fibroid with adeno-carcinoma, 1.
Epithelioma of the glands, 1.
Epithelioma of the vulva, 1.
Vaginal fibroid, 1.
Myxoma of the labium, 1.

Ovarian Tumours.

Simple—Ovarian cysts, 11.
Solid ovarian tumours, 5.
Dermoid cysts, 6 (1 double).
Papillary cysts, 2.
Ovary removed for pain, 1.
Normal ovary with twisted pedicle, 1.
Malignant—Ovarian tumours, 4.
Parovarian cysts, 1.
Tumours of the broad ligaments, 2.
Tubal diseases.
Pyosalpinx, 5.
1 tuberculous.
1 with tubal pregnancy.
1 with ovarian disease (abscess).
Hydro-salpinx, 1 (double).
Kidney tumours.
Pyonephrosis, 2.
Tuberculous kidney, 1.
Mixed-celled sarcoma round the right kidney, 1.

Supra-renal capsule tumours, 2.
Vesical calculi, 3.
Intestinal concretion simulating ovarian, 1.

OBSTETRICAL SPECIMENS.

Abortions—Missed, 1.
Complete cast with ovum, 2.
Blighted ovum, 1.
Tubal pregnancies, 3 (1 with pyosalpinx).
Anencephalic fœtuses, 4 (1 with exomphalos, 1 with hydro-rachitis).
Cyclops fœtuses, 2 (1 as a twin).
Hydro-cephalic fœtuses, 2 (1 with spinal tapping, 1 siren with spina-bifida).
Exomphalos, 3.
Uni-ovular twins, 1.
Child forty-one years in the abdomen, 1.
Cord conditions—
Velamentous insertion, 3.
Cyst of the cord, 1.
Succenturiate placenta, 1.
Marginate placenta, 1.
Obstetric satchels, 2.
Modification of Braun's hook, 1.
Bronze medal of Leipzig Obstetrical Society, 1.

There have been exhibited at our meetings during the last two years 150 specimens; 120 of that number may be classed as gynæcological, the remaining 30 as obstetrical. More than one-half of the gynæcological specimens were in illustration of various diseased conditions of the uterus. Simple fibroids of the uterus numbered 43. Of tumours showing fibro-cystic degeneration three were shown. Examples of cancer of the body of the uterus were six in number. A like number were cases of cancer of the cervix, and there were four specimens of sarcoma. One case of adenoma malignum and one of adeno-carcinoma complicating a fibroid tumour. Out of the total number of uterine specimens shown, one-fourth was malignant.

Of ovarian diseases we had thirty exhibits. Simple cysts numbered eleven, papillary cysts two, solid tumours five, der-

moid cysts six, while four tumours were malignant. The proportion of malignant to simple ovarian tumours was 1-7.

Diseased uterine appendages were represented by six specimens, five of which were examples of pyosalpinx and one of hydrosalpinx.

Of obstetrical specimens, amongst others there were three of abortions, three of tubal pregnancy, four of anencephalic fœtus, two of cyclops fœtus, two of hydrocephalic fœtus, three of exomphalos, and one child which had been forty-one years in the abdomen.

Nothing more is wanted to testify to the life of the Society and the activity of its Fellows than the number of specimens exhibited. The exhibition of specimens is now a distinguishing feature of our proceedings, and is of the greatest utility, not only from the interest which the specimens themselves produce, but as indicating the paths along which gynæcological surgeons and obstetricians are pursuing their work.

In conclusion, I have again to offer my heartfelt thanks for the indulgence and kindness which it has been my lot to receive from my Fellows of the Obstetrical Society during my term of office. Your kindness has made my work light and pleasant, and I shall always be able to look back on the time I occupied the Chair with feelings of real satisfaction.

I do not think I can more fittingly close my remarks than by quoting the words of one of our Hon. Fellows: "Wherever I go I notice that wherever men cordially support one another —and there is a great deal of warm affection among men in the profession—there medical work flourishes and medical science stands at its very highest."

OBSERVATIONS ON ORAL SYPHILIS[1]

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MR PRESIDENT AND GENTLEMEN,—It is your custom at this particular meeting to supplement your proceedings by the addition of a paper on what may be called an extra-odontological subject. This year you have been good enough to select me as lecturer, and my first duty, therefore, is to thank you very heartily for the honour. While, no doubt, your custom is, under favourable conditions, not without benefit to yourselves, it must be admitted that the task is not altogether an easy one for the lecturer. At the outset his choice of a subject is necessarily a limited one; further, its treatment is somewhat difficult. For these reasons I trust you will kindly overlook the many imperfections of the following remarks.

Many circumstances unite in making syphilis perhaps the most interesting of all diseases:—its great antiquity; the history of its extension into new countries; the mystery surrounding its organism; and the extraordinary variety of the tissues it attacks and of the phenomena it produces, leaving tuberculosis, its only rival in this respect, far behind. Further, one might cite its fatal gift of inheritance, the peculiar social stigma which attaches to its presence, its precocity in some cases, its latency in others, and its evil influence over other diseases. Lastly it is, unfortunately, a very common disease.

It is for the latter reason, and because its oral manifestations are so common, that I have taken the subject for my paper to-day.

In the neighbourhood of the mouth, as you are aware, all the three stages of syphilis may be met with. It is here, indeed, that perhaps the most common manifestations of the secondary stage occur, and these are of a notoriously contagious character.

It is, therefore, of the utmost importance that the dental surgeon should know something, at any rate, of a malady

[1] An Address delivered to the Odonto-Chirurgical Society of Scotland on March 16, 1906.

which he may accidentally acquire himself in the discharge of his duties, or even be the means of transmitting from one patient to another.

In this connection I would venture to suggest that no portion of the training of a dental student (apart from his special dental studies) is more important than clinical instruction in syphilis, and I trust that we may yet see attendance at a limited number of cliniques in the Lock Wards made a compulsory part of the Dental Curriculum.

I do not, however, wish to be misunderstood in this matter. I do not, for example, mean to infer that infection in the ways I have referred to is common ; on the contrary, such cases are rare. Medical men are much more often the victims of extra-genital chancre than dental surgeons. Still, instances do occur, and if you care to look into the atlases and text-books of venereal disease, you will find digital chancres figured from patients who were members of your own profession. Personally I have seen only one case. On the other hand, I have been consulted by four medical men with extra-genital chancres, and have known of others.

The reasons for your comparative immunity are not far to seek. Your work lies wholly in a cavity which is open to inspection. At the period when the risk of transmitting their disease is greatest, probably many of your patients stay away or inform you as to their condition. Much of your work is done instrumentally.

Sites and Causation of Oral Chancres.

Primary infection of the oral cavity may occur on the lips, tongue, tonsil, gums, and cheek. The two last sites are very rare. The lip, on the other hand, is a common situation ; indeed, it is the part of the body most frequently affected of all extra-genital chancres. The manner in which infection has occurred is very diverse. Thus it has followed kissing, biting, sucking, the use of infected pipes, handkerchiefs and napkins, unclean eating and drinking utensils, musical instruments, and the placing in the mouth of coins, pencils, and other objects. Infection has also appeared in epidemic form in connection with certain trades, such as glass-blowers, cigar rollers, etc.

Tooth-brushes provide a few instances. Thus a chambermaid acquired an oral chancre from using the tooth-brush of her employer—surely an excessive punishment for her indiscretion! Instances of inoculation from unclean dental instruments are not common, still Bulkley[1] has collected some fifty examples, and for obvious reasons such cases are much more likely to be unrecorded than recorded. Ward[2] cites a case where a dentist's mechanic was infected from handling a tooth-plate.

As regards soiled dental instruments, let me say in passing that the simplest, quickest, and surest method of sterilisation that I have seen is the plan whereby all such instruments, at the conclusion of each patient's visit, are dropped for a few minutes into a small metal vessel containing water kept boiling by a spirit or other lamp. In this way the process is carried out at once under the dentist's own eye, and the risk of neglected or imperfect sterilisation is very much lessened. Remember it is not syphilis only that can be communicated by unclean instruments.

Inoculation from Transplantation of Teeth.

Inoculation from the transplantation of teeth is nowadays, I suppose, only of historical interest. John Hunter,[3] in his celebrated treatise on venereal disease, refers to seven such cases, and devotes a chapter to their discussion. In nearly all the cases the tooth "fastened well," and gave rise to no disturbance for a month, when the gum began to ulcerate. Hunter was extremely sceptical that syphilis was present in any of them, and undoubtedly in some the symptoms were not sufficient to warrant the diagnosis. On the other hand, two cases, at any rate, appear in the light of subsequent knowledge to have been certainly specific.

While some of Hunter's arguments are very much to the point, it is interesting to note the following:—

"Let me suppose that the young girls from whom the teeth were taken really had the lues venerea, and that the teeth were of course also infected, which is a supposition most unfavourable to my real opinion, it appears to me that even in this case there can be no difference between the gums of the

[1] Bulkley, "Syphilis Insontium," 1894.
[2] Ward, "Clinical Studies in Syphilis," 1904.
[3] Hunter, "A Treatise on the Venereal Disease."

girl from whom the tooth was taken and the gums of the person who received it: if the ulceration took place in the last from contamination, would not the socket in the girl from whom the tooth was taken likewise have ulcerated? But this did not happen in any of them."

Again, in one of these cases, in addition to the local ulceration, an extensive rash, malaise, headache, and periostitis of the metacarpus occurred. No improvement followed ordinary treatment. Under a mercurial course all the symptoms disappeared, only to reappear and again be removed by a second course. Once more, symptoms returned, but after a third but milder course the patient was cured.

Hunter's comment is the following :—

"Query: could this case be venereal? The two first courses of mercury removing the eruptions would seem to prove it was; but the third course also removing them, which consisted of only ten grains of corrosive sublimate, would seem to prove that it could not be venereal; for if it had, the appearances which returned after the second course, in which a considerable quantity of mercury had been given, would not have yielded to ten grains."

The diagnosis of primary chancre on the genitals before secondary symptoms appear is often very difficult, sometimes impossible, and the same remark applies to chancres about the mouth. In this neighbourhood other organisms are always present, and they may set up much confusing inflammatory swelling. Chancres of the lips, however, may show very definite and characteristic induration. They are also usually associated with marked sub-maxillary glandular enlargement—the so-called "giant" bubo.

It is, however, the diagnosis of the secondary oral manifestations of syphilis that is of most interest to dentists. As a rule their recognition is not difficult, and where cutaneous lesions are present as well, there is little risk of their being mistaken for anything else.

The earliest affection of the mucous membrane, viz. the general erythema of the pharynx, which in the more marked cases produces congestion and swelling of the tonsils, may at first be mistaken for an ordinary sore throat. Skin rashes, however, or mucous patches soon appear, or the small, superficial, symmetrical, kidney-shaped ulcers on the tonsils with their white "snail track" edges, the diagnostic value of which has been emphasised by Hutchinson.[1] With regard to mucous

[1] Jonathan Hutchinson, "Syphilis," 1901.

patches, it should not be forgotten that they vary considerably in appearance. The typical mucous patch, whether in congenital or acquired syphilis, appears as a rounded or oval pearly white or greyish white plaque, resembling (in colour) the mark produced by silver nitrate. For diagnostic purposes it is also important to remember that it is raised above the level of the surrounding mucous membrane.

While there is no part of the oral cavity where mucous patches may not occur, they are specially often found on the lips and tonsils. When unexposed to irritation, for example, on the under surface of the tongue, the epithelium composing a mucous patch may become so heaped up and sodden as to justify it being termed a condyloma. On the other hand, if exposed to friction, the white covering may be rubbed off, leaving a raw, reddish, or yellowish area behind which, however, is still slightly elevated. Again, when irritated by a jagged tooth or by tobacco, a mucous patch may develop an inflammatory area around it, or may break down to form a superficial ulcer, or, if on the tongue, may become the seat of a fissure.

Fissures and superficial ulcers, however, occur in secondary syphilis, especially late secondary syphilis, without the previous development of mucous patches, and, if other signs of syphilis are absent, their diagnosis is often difficult, since such ulcers do not differ specially from ordinary dental ulcers. In children, also, in the absence of other symptoms, mucous patches may be mistaken for the patches of aphthous or parasitic stomatitis. The latter, however, are whiter. In adults, leucomata, presently to be referred to, may at first sight be mistaken for mucous patches, but their colour is different, they are not so raised, and the history of the case reveals that they have been there for a long time.

Finally, where secondary ulcers and fissures have persisted for some time, they often leave behind white scars, which on superficial examination resemble small mucous patches. Closer inspection, however, shows that they are scars and nothing more. Late secondary ulcerations on the tongue not infrequently leave areas denuded of papillæ behind them, of a bald, shining appearance.

The treatment of these mucous patches, superficial ulcers,

and fissures, consists in getting the patient under the influence of mercury, and locally painting the parts several times a day with chromic acid solution (ten grains to the ounce) or with corrosive sublimate (one grain to the ounce of a solution composed of equal parts of water and glycerine). Of all the numerous applications, these two seem the most useful. On the whole, the chromic solution is the best.

Gargles of various kinds are also good, but if they are to be of real efficiency, the fluid should be *retained for several minutes* in the mouth. As a rule, the act of gargling is inadequately performed. If the site of an ulcer has been determined by the presence of a jagged tooth or by a projection from a tooth plate, specific treatment will have little effect unless the local irritation be removed; usually, when this is done, improvement is immediate. I would, however, lay stress on the fact that if the local irritation be left for some time unattended to, this rapid improvement may not follow, the influence of the irritant apparently surviving its removal. On no account, therefore, should such patients be allowed to put off a visit to their dentist till a more convenient day.

Needless to say, all hot or irritating food or liquids should be avoided. As regards alcohol, the less the patient with syphilis takes of it the better. It was Ricord who said long ago, "If you wish to preserve your syphilis, pickle it in alcohol."

Tertiary Lesions—Leucomata.

The time at my disposal only permits me to refer in the briefest manner to tertiary lesions. Gummata of the palate, both in the congenital and in the acquired disease, are responsible for those deplorable perforations, for which, in most cases, surgery can do very little, but for which you can do a good deal. Gummata of the tongue, although not very common, are important, from the difficulty that may occur when they break down, in distinguishing the resulting ulcers from those of carcinomata.

Deep fissures are frequently seen in the tongue as the result of old syphilis. They may be horizontal or longitudinal in direction, or run in both ways. Sometimes they may be very

deep, and in severe cases the resulting disfigurement is so great that the tongue appears "ploughed up" by them, as Butlin puts it.

Lastly, considerable attention has been paid in recent years, especially by Butlin,[1] to certain conditions which have been termed "precancerous." These conditions are preceded by chronic inflammatory changes in the mucous membrane (or possibly in some forms by degenerative changes) which, in the case of the tongue, are included under the somewhat general term of chronic superficial glossitis. In some of these cases the tongue may be much denuded of epithelium, showing extensive bald areas of a smooth, shiny appearance. In others there may be raw areas, cracks, or fissures. In others, again, the whitish or brownish "smoker's patch" may be present, or the condition known as leucoma or leucoplakia. This by some is looked upon as simply a further development of the "smoker's patch." Butlin describes two varieties of leucoma. In one type, the patch of altered epithelium is thin and smooth, and bluish-white or silvery in colour; in the other, the patch is thicker and more dead white, and looks as if thick white paint had been daubed over a portion of the mucous membrane. These patches are found most often on the tongue, but are also met with on the inside of the cheek opposite the line of the teeth. Sometimes, as in this specimen I show you of cancer of the jaw, they may be found on the gum. They are seen most commonly in men of middle age, and especially in men who have had syphilis and who are smokers; but they may occur in women and in persons who have not had syphilis, and who neither smoke nor drink. Such leucomatous patches have occasionally been found to correspond accurately in size and shape with vulcanite tooth plates worn by the patients. These conditions are not themselves actually precancerous. Their presence, however, indicates a dangerous instability of the mucous membrane. Thus if a patch, say of leucoma, develops a small warty growth, or breaks down at one part and forms a little ulcer, that growth or ulcer may be looked upon as precancerous and, if not removed, will almost certainly soon become malignant. The danger in such cases, as Butlin points out, is that

[1] H. T. Butlin, "Diseases of the Tongue," also *ibid.*, *Brit. Med. Journ.*, Feb. 14, 1903.

the condition is either overlooked by the patient, or the absolute necessity for an *early* operation is not appreciated.

Now, in some cases, the dentist may be the only person who has the opportunity of seeing such precancerous conditions, and I cannot help thinking that a word in season from him might sometimes save a patient the loss of his tongue or even his life.

Smoking and Syphilis.

The effect of tobacco smoke on the mucous membrane of syphilitics varies greatly. Some patients are able to smoke throughout the whole period of their treatment without developing any obvious secondary manifestations. They are, however, the exception, and a small one. Usually, when mucous lesions appear, these are made much worse, and improve at once when smoking is suspended. Moreover, it is probable that, in a number of cases, their occurrence is determined by smoking, and might have been prevented had it been given up soon after the appearance of the primary sore. Most text-books are not severe enough in regard to this matter. The patient with primary syphilis should be strongly advised not to smoke; the patient with oral secondaries should be absolutely forbidden to do so. Only when he has safely passed the secondary period, should the patient be permitted to resume the habit.

Where a patient is allowed to smoke, or insists on doing so, he is usually recommended to use a pipe in preference to cigarettes or cigars, and to smoke the latter through holders. It is doubtful, however, whether this is always the best advice. Many persons normally find cigars and cigarettes much cooler and less irritating than pipes. I am not, of course, speaking of the short clay pipe, the possibilities of which for evil are so notorious that one wonders, in these days of popular lectures, that it still flourishes apparently as much as ever it did. Again, some cigarette smokers can only smoke Virginian tobacco owing to throat irritation, others only Turkish. Provided that cigarettes or cigars are not smoked to the bitter end, and are smoked slowly, I consider that, as a rule, they are cooler and less irritating than pipes, even pipes with long

stems, and that holders are best dispensed with. With holders or with pipes the smoke is concentrated into a single jet, and is projected as such very often against the same portion of the tongue or cheek for months. Further, it is difficult to avoid some tobacco juice getting into the mouth in smoking a pipe, and tobacco juice is more irritating than tobacco smoke. The influence of smoking on the formation of leucomata has already been referred to.

Mercury and Syphilis.

Of the sovereign value of mercury in the treatment of syphilis you are aware. The school that would withhold it is now practically extinct. The principal arguments against its use were two in number, viz. that it sometimes made the patient worse, and that, where it suppressed or modified the secondary symptoms, elimination of the poison was prevented, and, consequently, tertiary symptoms were more severe.

For the first of these statements, it must be confessed, there was at one time ample justification. These were the evil days of excessive dosage and excessive salivation, of loose teeth and ruined constitutions. The modern treatment by moderate dosage has, however, removed this objection, although occasionally patients are met with who, owing to idiosyncrasy, are unable to follow a mercurial course. A similar idiosyncrasy is noticed with regard to iodide of potash. Although the strongest possible believer in the value of mercury, I would prefer not to treat a patient at all with mercury than to over-treat him with it. One of the most cheering facts in the somewhat gloomy literature of syphilis is its tendency, under favourable conditions, to wear itself out with time. Bearing on this point, a paper of considerable interest appeared some years ago by E. H. Douty.[1] In urging the value of an open-air treatment for syphilis, as for tuberculosis, that author stated that he had noticed that people who led a country life, hunting-men, for example, although often most careless in carrying out their treatment, frequently did better than students and city clerks, who pursued their specific treatment with the utmost devotion.

[1] The Open-Air Treatment of Syphilis, *Brit. Med. Journ.*, Feb. 28, 1903.

With reference to the argument that tertiary symptoms are more frequent in patients that have been treated with mercury, it need only be said that this assertion has not been confirmed by the verdict of experience.

A Plea for the more Frequent Use of Inunction.

As regards the best *method* of administering mercury, I trust I will not be thought presumptuous or dogmatic in expressing the opinion that the value of inunction is not yet sufficiently recognised in this country.

While admitting at once that good results follow all the methods, the following reasons have led me during the last six years to employ inunction much more often than before.

In the first place, my experience of it leads me to the belief that in most cases it does get rid of secondary lesions more quickly and more thoroughly than the oral method. Secondly, where lesions have been rebellious under the oral method, I have seen manifest improvement follow when inunction was substituted for it. On the other hand, I cannot recall a case where the converse was true, although I have seen cases where *injections* have proved more valuable than inunction. Thirdly, I have been struck with the fact (apart from the very general employment of the method abroad) that neurologists, in cases where nervous symptoms are prominent, seem to prefer it to the oral method, or, at any rate, are very ready to fall back on it. Thus, Gowers[1] writes: "We cannot improve on the physicians of long ago in the method of administering mercury. The old method was to rub it into the skin, and it is, I am sure, the wisest." If, then, this method is so valuable for special cases, why not employ it for ordinary ones? Fourthly, I think that mercury, no less than many other drugs, tends to lose its effect (*i.e.* its specific effect) if it is continued for months without intermission, as is generally the case where the oral method is used, and that it strikes with greater force if the tissues have been allowed intervening periods in which to lie fallow, as is the case where inunctions (or injections) are

[1] "The Prognosis and Treatment of Syphilitic Disease of the Nervous System," *Brit. Med. Journ.*, April 4, 1903.

THE SUPRARENAL GLANDS IN ACUTE AND CHRONIC AFFECTIONS

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RECENT researches in connection with the physiology and pathology of the suprarenal glands have brought to light so many important facts, and have so conclusively shown how powerful a factor these organs are in the general bodily economy, and how far-reaching and profound the changes are which result from interference or interruption of their normal function, that it has seemed to me not without interest to record the facts detailed below, and to present this short paper on the relation between types of disease and the accompanying suprarenal changes.

In the present paper I have dealt with the examination of the suprarenal organs of 50 cases dying from various diseases, 25 of these being adults and 25 children under 10 years of age, and at a future period I propose to give the results of further investigations in connection with some of the more striking conditions here obtained.

The division of these cases into those occurring in adult and those in child life was originally undertaken owing to the marked difference in the influences and factors at work in the causation of disease in childhood and in adult life, and to the equally marked difference in the clinical course and symptoms of illness at those periods, and is further justified by the very different condition of the organs during the two periods.

In all cases careful clinical observations were obtained during life, and after death the suprarenal organs were dissected out, placed in 5% Formalin, and weighed in the moist condition.

Several sections were then taken from the centre of both glands from above downwards, and were stained in the usual manner with Hæmatein and Eosin, Hæmatein and Van Gieson stain, Hæmatein and Methyl Violet, Sudan III. and Hæmatein, Scharlach R. and Hæmatein, and also fixed in Marchi's [illegible] and mounted unstained.

more especially in the fibrous tissue between cortex and medulla.

Hæmorrhage, as above noted, was present in 6 cases (24 per cent.), and occurred in 4 instances at the inner margin of the cortex, between it and the medulla and largely affecting the medulla. In one instance it destroyed for the most part cortical tissue, and in one case it consisted of diffuse medullary infiltration.

In 4 cases minor changes were present, consisting of marked congestion of the zona reticularis and medulla, with numerous areas of lymphocytic infiltration.

Fat.—In all cases fat was present in the parenchymal cells of the cortex. In 6 cases it was very slight in amount, and occurred as very fine droplets within the parenchymal cells. Where fat was present to any marked extent it occurred as fine, medium, and large droplets in the cells of the zona glomerulosa, and it also occurred as medium and large droplets in the cells of the zona fasciculata. It was most common and most plentiful in the cells of the zona glomerulosa. Of the 19 cases in which a considerable amount of fat was present in the cells, in 11 cases it was most abundant in the zona glomerulosa. In 4 cases, fat was most abundant in the zona fasciculata and was present here, more especially in the outer layer immediately underlying the zona glomerulosa. In the remaining 4 cases it was more or less evenly distributed throughout the cortex. In no case was fat present in large amount in the zona reticularis, although it not infrequently occurred in the fibrous tissue immediately internal to it.

In Class *A*, 2 cases showed the presence of a slight amount of fat, and 9 cases a considerable amount.

In Class *B*, 3 cases showed the presence of a slight amount of fat, and 7 cases a considerable amount.

In Class *C*, 1 case showed the presence of a slight amount of fat, and 3 cases a considerable amount.

Fibrous Tissue.—In respect of fibrous tissue changes, in 14 cases nothing noticeable was marked. In 9 cases there occurred to a greater or less extent a well-defined fibrous change; intermediate layer separating cortex and medulla served as a very distinct dividing line, and was

seat of fibrous tissue increase. In [illegible] and in 1 case slight fibrosis of the [illegible] presence of this layer; while in [illegible] increase of connective tissue in the [illegible] marked intermediate layer.

In Class *A*, 3 cases showed [illegible] increase, 8 none.
In Class *B*, 4 cases showed [illegible] increase, 6 none.
In Class *C*, 2 cases showed [illegible] increase, 2 none.

Pigment—In all the cases [illegible] only to a very slight extent. [illegible] within the cells of the zona [illegible] cases no pigment [illegible] was seen it occurred [illegible] of the intermediate [illegible]

Beyond fatty [illegible] of long-standing changes [illegible] cells of the cortex and [illegible] cortical cells was in all cases [illegible] between cells of zona [illegible] the majority of cases [illegible] more or less marked [illegible] of cases, the medullary cells [illegible] being, as a rule, those in the [illegible] were most marked in the [illegible]

From the foregoing facts [illegible] under the category of [illegible] changes were vascular [illegible] considerable hæmorrhage [illegible] cells, passing on to [illegible] marked in the medulla [illegible]

In Class *B*, acute [illegible] vascular changes were [illegible] fibrous tissue throughout [illegible]

Cases in Class [illegible]

Division of the cases according to the cause of death shows that 9 cases died of tubercular affections :—

1 case being in Class *A*.
6 „ „ *B*.
2 „ „ *C*.

Of these 9 cases, in 2 there were found several small tubercular nodules in the cortex of the organs, 1 being in a case of general tuberculosis with acute termination, and 1 in a case of old-standing tuberculous pyonephrosis.

Seven cases of non-tubercular broncho-pneumonia occurred, 5 being in Class *A* and 2 in Class *B*. Of these, hæmorrhage was found in 2 cases, both in Class *A*.

The direct cause of death in the 6 cases in which hæmorrhages were found was in 4 cases broncho-pneumonia, 1 case tuberculous meningitis, 1 case gangrene of the scrotum.

II. Adults.

A. Four cases came under this heading. In none of these were vascular changes very marked, 1 case showing no definite abnormality, while in the other 3 cases there were areas of lymphocytic infiltration in the medulla, zona reticularis, and inner layers of the zona fasciculata. In 2 cases the parenchymal cells showed no distinct departure from the normal ; in 1 case there was cloudy swelling of cells in the medulla and zona glomerulosa, with great irregularity and some degree of atrophy of cells in zona fasciculata; while in the fourth case, in addition to acute changes in the cells, there were also evidences of more long-standing alterations in both medulla and cortex. In this latter case there was marked general fibrosis throughout the gland, with considerable hyaline degeneration of this tissue, and, consequently, considerable irregularity and distinct atrophy of the cells in the zona fasciculata ; while in the former case, in addition to the cloudy swelling above noted, there was also a definite fibrous tissue increase throughout the gland.

B. Of 10 cases in this Class, 2 showed no vascular changes whatever, 1 showed a marked condition of lymphocytic infiltration in the cortex, 1 showed several small capillary hæmorrhages in the deeper layers of the cortex, while 6

showed lymphocytic infiltration of the medulla and zona reticularis. In 4 cases there was marked increase of fibrous tissue in the organ, with in 1 case waxy degeneration of it, and in 1 case hyaline degeneration. In 1 case no obvious cellular changes were present, in 1 case there was general granular swelling of the parenchymal cells, in 2 cases cloudy swelling of medullary cells, and in the remaining 6 cases considerable acute and long-standing changes which will be described later.

C. In this Class there were 11 cases. In 7 cases there was no vascular abnormality, in 4 there were areas of lymphocytic infiltration in the medulla and zona reticularis, and in one of these cases there was also present a small hæmorrhage in the left gland at the junction of the cortex and the medulla. In 5 cases there was marked fibrous tissue increase with, in 2 cases, waxy degeneration of it. In all the cases but one there were distinct changes in the parenchymal cells.

Vascular.—Of the 25 cases examined, in 10 instances no definite vascular changes were observed, in most instances there being very little blood in the vessels. In 2 cases small hæmorrhages were present at the inner margin of the cortex, while in 14 cases the changes were of a minor degree. In 13 of these there was a more or less marked degree of lymphocytic infiltration of the medulla and in the zona reticularis, while in 1 case there were very extensive patches of lymphocytic infiltration in the cortex and not in the medulla. Vascular changes were consequently present in 60 per cent. of all the cases, the changes for the most part being, however, slight in degree.

Fat.—In these organs, fat occurred firstly as very fine droplets in the cells, and as the amount increased these droplets enlarged in size and apparently coalesced. It occurred to much the greatest extent in the zona fasciculata and least in the zona reticularis, and thus it was commonly found as large and medium droplets in the zona fasciculata, as medium and small droplets in the zona glomerulosa, and was only rarely present as fine droplets in the zona reticularis. In the medulla, fat was occasionally found as medium sized droplets in the connective tissue stroma, and not in the parenchymal cells them-

selves. It also occurred freely in cortical cells included in the medulla. In 2 cases very little fat could be made out. In 19 cases it was plentiful, and in 4 cases it was present to an extreme degree. In 3 of these latter cases it was present in the usual distribution in excess; while in the remaining case it occurred throughout as extremely numerous, very fine droplets, showing no tendency towards coalescence.

A division into Classes shows :—

	Little Fat.	Fat Plentiful.	Fat Extreme.	Total Cases.
A	1	3	—	4
B	1	7	2	10
C	—	9	2	11

Fibrous Tissue.—In 10 cases there were no fibrous tissue changes noted. In the other 15 cases increase of fibrous tissue was apparent, in 4 cases this being present to a slight extent, and in 3 cases to a moderate extent throughout the gland. In 3 cases there was evident a slight tendency to the formation of an intermediate layer between the cortex and the medulla; all these cases showing also general increase of connective tissue. In 2 cases there was marked fibrosis of both cortex and medulla, in one of these cases the fibrous tissue having undergone hyaline degeneration, and in 3 cases there was considerable increase of fibrous tissue most marked in the medulla.

The remaining 3 cases showed increase of fibrous tissue with waxy degeneration of it. In 2 instances there was a moderate degree of general fibrosis, while in the remaining one there was very marked cortical fibrosis and slight medullary fibrosis, the fibrous tissue showing most distinct waxy degeneration throughout.

The fibrous tissue increase constantly occurred in connection with the blood-vessels, but there was no obvious relationship between glandular fibrosis and thickening of vessel walls, nor did its presence appear to be connected in any marked degree with the age of the patient.

	Little or no Fibrous Increase.	Distinct Increase.
A	2	2
B	6	4
C	6	5

Pigment.—In all cases there was a very distinct amount of pigment present which occurred as brownish granules within the cells of the zona reticularis, and also to some extent in the cells in the deepest layer of the zona fasciculata. There would appear to be a distinct relationship between the age of the patient and the amount of pigment present, the older the patient, the more pigment being present.

As regards the parenchymal cells, in practically all cases there was more or less marked irregularity of the cortical columns. Owing to the constant presence of pigment granules in its cells, the zona reticularis was very readily distinguishable from the zona fasciculata. Cells of the latter zone frequently occurred as isolated groups in the medulla.

In 4 cases no distinct abnormality of cells was noted, while in 2 there was no abnormality except a definite degree of overgrowth of cortical cells. In 8 cases there was evidence of chronic changes in cortical cells with acute changes in medullary cells, 2 of these cases also showing overgrowth of cortical cells and one containing a tubercular nodule in the cortex.

In 6 instances there was cloudy swelling of medullary cells, and in 3 cases there were acute cellular changes throughout both cortex and medulla, 1 of the latter cases being also associated with cortical overgrowth. In 1 case there were both chronic and acute cellular changes throughout the organ, and in 1 case there were chronic changes in cortical cells. Medullary changes consisted in granular swelling and protoplasmic disintegration, while the cortical changes were considerably more various. They consisted of fatty degeneration; cloudy swelling passing on to destruction of cells—most common in the zona glomerulosa; shrinking and atrophy of cells — specially of zona fasciculata; and also in some cases hyperplasia of cells of zona fasciculata.

Summing up the results found, as divided into the three classes of cases, I find—

1. Extensive and severe vascular changes are marked in no class, but slight changes are fairly frequent in all.

2. Fat occurs plentifully in all, and is apparently most abundant in chronic cases.

3. The changes found as regards fibrous tissue and the

condition of the parenchymal cells show practically no difference on division into these three classes.

One case examined, that of fracture of the skull, occurred in a healthy man, the suprarenal glands as well as the other organs in the body being found in a normal condition.

As regards the other cases, it has not been found possible to record any definite changes as peculiar to any group of cases.

From the foregoing, it appears that a division of suprarenal glands into those of child and those of adult life is justifiable.

In the structure of the gland, marked differences exist at these periods, and no less marked are the reactions to morbid processes.

A reference to the literature on the subject of the findings in the course of examination of extended series of these organs shows the following facts.

Mattei (1) examined the suprarenal glands in a series of 1301 post-mortem examinations, and divides his cases into the following groups:—

1. Caseous condition of organ	.	23	cases.
2. Inflammation „	.	2	„
3. Cancer „	.	2	„
4. Sarcoma „	.	3	„
5. Lipoma „	.	5	„
6. "Linfoma" „	.	1	„
7. Adenoma „	.	11	cases, all in one gland only—10 of cortex and 1 of medulla.
8. Hæmorrhage „	.	7	cases.
9 Waxy condition „	.	2	cases—1 phthisis, 1 miasmatic fever.
10. Atrophy and arrested development of organ . . .		5	cases.

Marchetti (2), as the result of examination on the cases of 1200 post-mortems, could find no relation between the various diseases and the condition of congestion of the suprarenal organs; while as regards the conditions of fatty infiltration,

he finds that this occurs mainly in the cortex, and agrees with May that it occurs most markedly in cases of heart and lung disease, in affections of the vessels, and in anæmia.

May (3) examined the suprarenal organs in 42 cases dying of different diseases, and found that when pathological changes were present they consisted chiefly of cloudy swelling and fatty degeneration, this latter occurring as has just been described.

Oppenheim and Loeper (4), as a result of examinations conducted in 9 cases dying of pure diphtheria, 11 cases of complicated diphtheria, and 16 cases of pneumonia, find that the chief lesions are protoplasmic changes passing on to necrosis, capillary dilatation, hæmorrhages, venous thrombosis, and minute abscesses formed of polynuclear cells. In addition, they also found infective nodules, a condition which did not occur in their experimental cases.

In these experimental cases (5) they dealt with guinea-pigs which were inoculated under the skin of the abdomen. In the case of inoculation with diphtheria bacilli, the chief results found were—

(*a*) Congestion and hæmorrhage.

(*b*) Diapedesis of polynuclear leucocytes in zona fasciculata, and at the limit of zona fasciculata and zona glomerulosa.

(*c*) Cellular lesions of all degrees up to actual necrosis, specially marked in zona reticularis and zona fasciculata.

These lesions varied in intensity according to the virulence of the infection and the longer or shorter survival of the animal, the less-marked lesions occurring in those animals which lived longest.

After injection of pneumobacilli, the most striking results were hæmorrhages occurring in the centre of the gland, while here also lesions were most marked in those animals which succumbed most quickly.

Federici (6), as the result of experimental work with guinea-pigs and rabbits, examined the lesions resulting from acute and chronic infections. In the former cases he found marked hyperæmia, and in the most acute cases large hæmorrhages both in cortex and medulla; while in the chronic cases congestion was considerably less marked, and hæmorrhages were rare, and when present only small. The

cellular condition in acute cases showed at an early stage cloudy swelling, which later passed on to cell necrosis; while in chronic cases many cells were normal, others showed cloudy swelling, and there were also present areas of necrotic tissue. In these chronic cases, also, there was marked cortical increase of connective tissue.

Bernard and Bigart (7), after experiments on guinea-pigs with mineral infections, come to practically the same conclusions.

In the afore-mentioned papers, no distinction is drawn between results found in childhood and adult life, while from consideration of farther literature, the following facts and observations have to be noted :—

That hæmorrhage in the suprarenal is markedly more common in the young than in adults, has frequently been noted [Arnaud (8), Ribadeau-Dumas et Bing (9), Fleischer and Penzoldt (10), Karakascheff (11)], the hæmorrhage usually originating in the very vascular layer at the junction of cortex and medulla. Many cases have been recorded, and Droubaix (12), while noting the much greater frequency of hæmorrhage in the young, considers that while in those cases the medulla is chiefly affected, hæmorrhages in the adult occur more especially in the cortex.

Oppenheim and Loeper (13) found hæmorrhages in these organs in one-third of the cases dying of pneumonia.

As regards the fat contained in cortical cells, be it a secretion, degeneration, or infiltration, the following points recorded by Napp (14) are worthy of note. In ninety-five cases of various diseases the suprarenal organs were examined microscopically after being stained with Sudan III. and hæmatoxylin. A marked difference in the grouping of the fat was found between the cases of adults and those of young persons under twenty years of age. In youth, the cells of the zona glomerulosa always contained fat in the form of fine droplets. In a less degree the cells of the zona reticularis contained the like, while only in cases showing the presence of a very large amount of fat did it occur in the zona fasciculata.

In adults, on the other hand, the cells of the zona fasciculata always contained fat, next in amount those of the zona reticularis, while the cells of the zona glomerulosa were almost entirely free of fat.

The greatest amount of fat in youth occurred in cases of miliary tuberculosis and of pulmonary tuberculosis, and in adults in cases of pulmonary tuberculosis, fibrinous pneumonia, and phthisis pulmonalis. The suprarenals of young persons contained distinctly more fat than those of adults, and the amount of this fat bore no relationship to the condition of the general bodily nourishment.

Examination of the present series largely bears out these findings of Napp. In the cases of children, fat was found most plentifully in the cells of the zona glomerulosa, but was not found to the same extent in the cells of the zona reticularis, as is described by this author.

In adults, on the other hand, fat occurred to much the greatest extent in the cells of the zona fasciculata, but again I have to record extremely little fat in the cells of the zona reticularis.

The cells of the zona reticularis contained relatively more fat in childhood than in adult life, and at the same time were distinguished by an almost entire absence of pigment granules. In later life this pigment was in nearly every case abundant, and the cells apparently showed a corresponding diminution in the amount of fat.

A further difference in the construction of these organs in youth and adult life appears to me to be found in the region of the junction of cortex and medulla. In this region in childhood there occurs commonly a distinct fibrous-tissue layer separating the cortex from the medulla, a condition infrequent in adults.

With regard to the changes occurring in these organs, I have previously noted that in childhood the changes may be said to vary very largely, according to the duration and intensity of the fatal affection, whereas in adults this is not the case.

In both classes of cases cortical fat was present in large amount in chronic wasting diseases.

Slight vascular changes were found to be more common in adult cases than in those of childhood, but whereas among the former cases, in two were small capillary hæmorrhages seen, among the latter, extensive hæmorrhages were present in six cases, and thus vascular changes in childhood, though less common, were more severe when present.

In ten cases in all death was due to pneumonia or broncho-pneumonia, extensive hæmorrhages being present in four of these cases.

The interesting condition of adenoma was present in four cases. Letulle (15), Pilliet (16), and Delamare (17) discuss this, the latter observer stating that the senile organ shows a natural tendency towards the condition. Letulle states that the occurrence is most common in cases of phthisis, cancer of the stomach, and valvular heart lesions, the cases in the present series being those of carcinoma of the œsophagus, cerebral tumour, acute supervening on chronic endocarditis, and tabes dorsalis with ultimate septic broncho-pneumonia and pericarditis.

The seat of these growths is invariably the cortex of the organ, a point of interest in connection with the observations of Chvostek (18), that the cortex is the part of the gland essential to life, owing to its power of destroying or neutralising noxious substances in the body.

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SOME OBSERVATIONS ON PAROXYSMAL HÆMOGLOBINURIA

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THE objects I have in view in the following contribution to the literature of Paroxysmal Hæmoglobinuria are, first, to furnish a brief account of the results of some of the more recent researches upon the pathology of the disease, and, second, to discuss the possible significance of one or two cognate matters of some clinical interest.

In view of the comparative rarity of cases of paroxysmal hæmoglobinuria, it may be advantageous to summarise the chief clinical features of the disease before proceeding with the main objects to be considered.

The disease is one which runs a chronic course, and, as its name indicates, is characterised by the occasional excretion of hæmoglobin in the urine. It is generally held that, in the majority of cases, hæmoglobinuria is determined by exposure of the predisposed individual to cold, while less frequently it follows physical or mental exertion.

The symptoms of an approaching paroxysm are briefly as follows : The patient has a sensation of intense cold, especially in the extremities of the limbs, which become pale and somewhat cyanosed, rigor follows, and the temperature usually rises several degrees. Yawning, sickness, vomiting, and diarrhœa are fairly frequent symptoms, especially in severe paroxysms, and a dull pain, seated in the lumbar region, is generally present. In the great majority of paroxysms a reddish-brown or porter coloured urine, containing free hæmoglobin, is passed a few hours after the first symptoms have shown themselves.

The paroxysm may last only a few hours, and the patient soon feels well again, provided the exciting cause is removed. In mild paroxysms, albumin only may appear in the urine, and possibly there are still less severe paroxysms in which even albuminuria is absent. Microscopic examination of the urine in the typical paroxysms reveals the presence of granular pigment, some imperfect blood-cells, and epithelium ; and on spectroscopic examination, the bands characteristic of oxy- or

met-hæmoglobin are seen. The well-known influences of cold and fatigue in inducing the paroxysms may be considered the most constant feature of the disease. It may be assumed that destruction of blood corpuscles is an essential feature in all paroxysms, not only when hæmoglobin or albumin is excreted in the urine, but also when this sequel of red cell destruction is absent. It is interesting to bear in mind the well established fact that hæmoglobinuria sometimes occurs in healthy individuals as the result of excessive *heat* applied to the surface of the body, such as occurs in some extensive burns even of a mild degree. Such corpuscular destruction may be produced in an entirely different manner, but it is possible that in both cases we have to do with the action of some toxic substance.

The more the pathology of paroxysmal hæmoglobinuria is studied, the more evident does it become that the Raynaud's symptoms, which are a constant feature of the paroxysm, play a very important part. The theories of Murri and Chvostek, although they differ from one another in important respects, are both based on the assumption that there exists in this disease a state of unusual vaso-motor irritability.

Without entering at present into the question how the Raynaud's symptoms are produced, the important point to note is that the constricted condition of the vessels of the extremity during paroxysms must have an important effect on the *temperature* of the limb. The significance of this will be explained later.

In malaria and paroxysmal hæmoglobinuria (in each of which there is paroxysmal destruction of red cells) it would appear that the different fate of the hæmoglobin which is set free, is dependent not on the relative *amount* of corpuscular destruction characteristic of the two diseases, but rather on the *nature of the change produced in the hæmoglobin.*

Now, Grawitz (1), in a paper on blood poisons, states that there is (*a*) a granular degeneration of cells not associated with hæmoglobinuria ; (*b*) a plasmolytic change in the blood causing hæmolysis and hæmoglobinuria. This seems to constitute the difference (in regard to the occurrence of hæmoglobinuria) which exists between malaria and paroxysmal hæmoglobinuria.

The occasional occurrence of hæmoglobinuria in malaria is probably not directly the result of the Laveran's organism,

but the free hæmoglobin may then be exposed to the solvent action of some toxic substance casually present in the serum.

Recent experiments have advanced our knowledge of the pathology of paroxysmal hæmoglobinuria very considerably. In a paper which was read in January 1904, and has since been published (2), I have described experiments in which the serum of paroxysmal hæmoglobinuria was shown to have the power of dissolving (*a*) normal and also (*b*) paroxysmal hæmoglobinuria blood corpuscles at the ordinary *room* temperature, while it fails to do so at the body temperature. Therefore the serum was both isolytic and autolytic. The same paper contained some observations which seemed to show that the hæmolytic property of the serum (blood serum and also blister serum) depended on the combined activity of two substances having the properties characteristic of an *Intermediary Body* and of *Complement*. At a later date Donath (3) published experiments in which he stated his failure to discover any noteworthy hæmolytic power in the serum ; but still more recently Donath (4), working with Landsteiner, conducted a notable research as a result of which they independently arrived at the same conclusion as I had. They demonstrated the hæmolytic property of paroxysmal hæmoglobinuria blood serum on normal blood when a mixture of the two was exposed for half an hour in ice water, followed by three hours' exposure at 37° C. They at the same time showed (in accordance with my observations) that a lesser degree of cold was sufficient to favour the occurrence of hæmolysis.

Such cold when applied either to washed (*a*) normal, or (*b*) paroxysmal hæmoglobinuria red blood corpuscles on the one hand, or to the hæmolytic serum on the other, or to both independently, did not induce hæmolysis, when thereafter the serum and corpuscles were mixed. It was found that the serum and corpuscles must be in contact *during* the period of exposure to the low temperature, and not only so, but they must also be in contact during the subsequent period at 37° C. The same observers gave further proof that the toxic substance or hæmolysin was a compound body, as I had previously indicated.

Finally, they showed that it was the intermediary bodies

which became anchored to the red cells during the exposure to cold, and when the temperature is thereafter allowed to rise to normal, complement unites with those intermediary bodies which had become attached to the red corpuscles. I have attempted to illustrate what is supposed to take place in such *in vitro* experiments by the annexed scheme.

Now I (5) have shown that the washed blood corpuscles obtained from a paroxysmal hæmoglobinuria patient during a paroxysm show hæmolysis without any previous exposure to cold. It was thus evident that the corpuscles at such periods have already taken up intermediary bodies *in vivo*, and only now require some normal blood serum (complement) to complete at the blood temperature the combination R.B.C. + I.B. + C.[1] That is to say, when blood was obtained from the patient, stage iii., represented in the illustration, had already been reached.

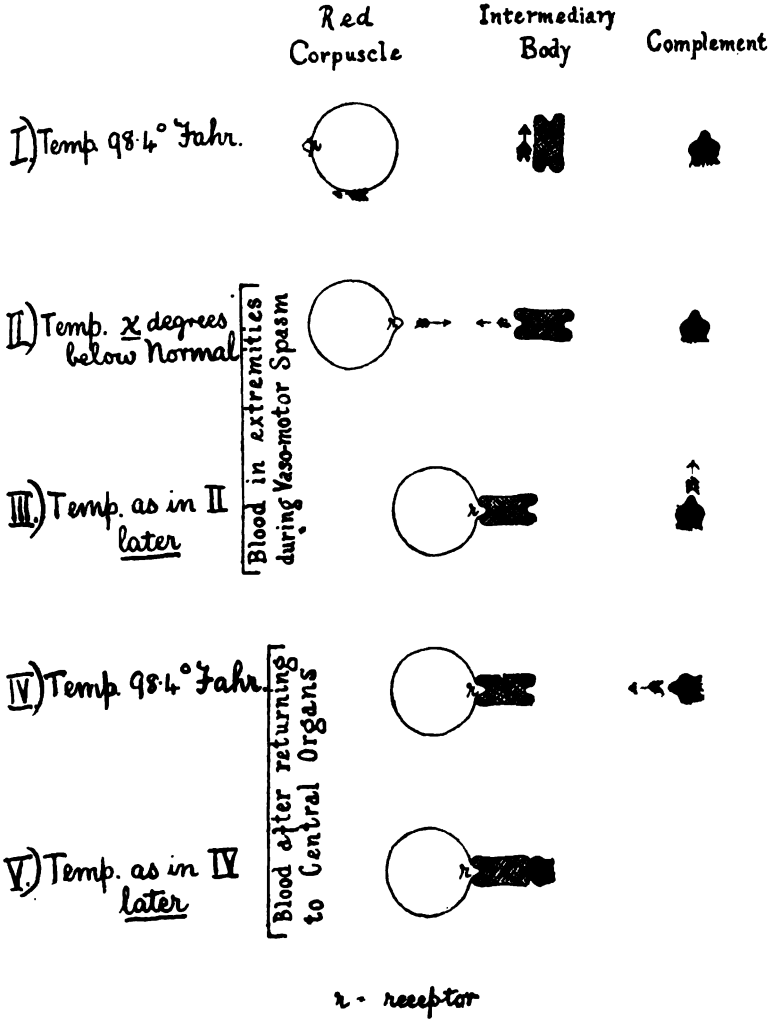
I have repeatedly tested the properties of the serum of paroxysmal hæmoglobinuria cases and have always found it to possess decided hæmolytic properties, even immediately subsequent to a paroxysm. It would thus appear that (*a*) the *duration* of a paroxysm is not limited by the amount of toxic substance available, and that (*b*) the *initiation* of a paroxysm is apparently not determined by any increase in the amount of the pathological constituent. At all times *the serum contains sufficient potential toxine to cause a paroxysm, but the activity of the toxin is manifest or in abeyance according as the state of the temperature is suitable or not.* I have further proved that the intermediary body of paroxysmal hæmoglobinuria is distributed widely throughout the body, for the serum obtained from blisters is also highly hæmolytic, and all the foregoing points may readily be proved by employing it in place of blood serum as I have described.

Further, I have formed the opinion that the toxin of individual cases of paroxysmal hæmoglobinuria is similar in nature, *i.e.* it is specific of the disease. I arrived at this conclusion after an investigation in which I injected a guinea-pig several times with the blister serum obtained from one of my cases, and found that the serum of the injected guinea-pig was now anti-toxic, not only for the serum of the case employed for

[1] R.B.C. = Red blood corpuscles. I.B. = Intermediary body. C = Complement.

the injections, but also for that of two other cases of paroxysmal hæmoglobinuria.

In describing the symptoms of paroxysmal hæmoglobinuria,


Red Corpuscle
Intermediary Body
Complement
I) Temp. 98·4° Fahr.
II) Temp. x degrees below Normal
III) Temp. as in II later
Blood in extremities during Vaso-motor Spasm
IV) Temp. 98·4° Fahr.
V) Temp. as in IV later
Blood after returning to Central Organs
r - receptor

I have already indicated the etiological relation which cold bears to paroxysms. The probable explanation of the relationship is afforded by the experiments to which allusion has been made. What takes place *in vivo* is probably this, viz. when

the blood is circulating in the colder portions of the body (in the hands and feet, face and ears, etc., and also in the nasal and oral cavities) the union of red blood cells and intermediary bodies takes place. When the blood subsequently returns to the warm central organs, the complement, being favoured by satisfactory conditions of temperature, participates in the union, and hæmolysis thus results. But there still remains to be explained the manner in which fatigue may cause paroxysms, as it undoubtedly can. The fact itself has induced many workers to investigate the state of the metabolism in paroxysmal hæmoglobinuria, and while decided enough changes have been observed, no satisfactory explanation of this curious fact has yet been offered.

Some light may be thrown on the subject of the etiological relation of fatigue to the paroxysms by an observation made in two of my cases of paroxysmal hæmoglobinuria.

I have obtained from these patients a very definite assertion that since the onset of their illness, instead of becoming warmer during physical exertion, they now invariably become *colder*. Moreover, if the exertion is increased or prolonged (as it sometimes was with the intention of restoring warmth), the sensation of cold is only increased thereby, until finally a paroxysm ensues. I would therefore suggest the possibility that after all it may be cold which determines all paroxysms—even those which are apparently caused by fatigue. I would further venture to suggest that there may be formed an abnormal fatigue product. This may be (*a*) the direct cause of vasomotor spasm and Raynaud's symptoms, thereby depressing the temperature of the extremities and conducing to paroxysms; or (*b*) in the formation of this product there may be diminished heat production.

A consideration of the occurrence of hæmoglobinuria in horses also throws light upon the influence that fatigue has in producing hæmoglobinuria. This subject is somewhat fully discussed by Camus (6).

As regards the source of the intermediary body of paroxysmal hæmoglobinuria, it is difficult at present to speak definitely. Malaria and syphilis are fairly frequent precursors of paroxysmal hæmoglobinuria, but it has now been proved that the previous existence of either is not a necessary factor

for the occurrence of this disease. Stempel (7) examined the literature, and concluded that 29.8 per cent. of fully reported cases of paroxysmal hæmoglobinuria had suffered from syphilis. One or two cases of paroxysmal hæmoglobinuria are also reported to have been cured by inunction of mercury (8). No micro-organism has been found in the blood of those affected with paroxysmal hæmoglobinuria.

In conclusion, a brief reference may be made to the significance of a symptom which is sometimes present in cases of paroxysmal hæmoglobinuria, viz. urticaria.

Lichtheim (9) was the first to note the occurrence of urticaria in cases of this disease, and the observation has since been made frequently by others, among whom may be mentioned Boas, Küssner, Donath, and Murri. Joseph has recorded a case of paroxysmal hæmoglobinuria which showed circumscribed œdema, and Von Trumpp mentions swelling of the back of the hands in one case.

Lucien Roques (10) has described a case in which the urticaria was peculiar. The case was that of a man aged 33 who had suffered for three years from paroxysmal hæmoglobinuria. If a portion of the skin was exposed to *cold* for a short time (a minute or half a minute was sufficient) by any means—for example, by the ether spray, or by the application of ice, or of a metallic body—a pruriginous urticarial wheal, surrounded by a rosy band, appeared in two or three minutes. It attained its maximum in four or five minutes, and disappeared in ten or fifteen minutes, leaving a yellow patch of œdema which lasted for two hours. When the œdema passed away there still remained a yellowish tint which persisted for about twenty-four hours. The patient for some months had noticed occasionally that the parts of his body exposed to cold became swollen. Apart from this effect of cold, dermographia could not be produced. Roques endeavoured, without effect, to produce the phenomenon in a number of cases of nervous disease which already presented vaso-motor disorders. He also failed in several patients who were the subjects of dermographia. The yellow coloration of the wheals was evidently due to local transudation of hæmoglobin. Fraser (11) has also recently described a case of urticaria e frigore, and has likened the pathology of the condition to that

of paroxysmal hæmoglobinuria e frigore, *i.e.* that it is due to some abnormal constituent of the blood which shows activity on exposure to cold.

Boas (12) formed the opinion that the association of urticaria with paroxysmal hæmoglobinuria was one which indicated that the latter disease has a neuropathic origin, as Von Popper (13) and others have already suggested. The advocates of the neuropathic theory hold that the liability to the occurrence of urticaria in individuals affected with paroxysmal hæmoglobinuria is proof that undue irritability of the vaso-motor system exists in them.

But at the present day one is accustomed to think of urticaria chiefly as an associate of toxic conditions of the blood, and (as I have already indicated) the existence of a potential toxin in the blood in paroxysmal hæmoglobinuria has now actually been proved. Moreover, it should be borne in mind that the urticaria of paroxysmal hæmoglobinuria is distinctive in this respect, viz. that it may be produced by exposure of the skin to cold; and it should be further noted that such exposure is likewise the cause which renders active the blood toxin of paroxysmal hæmoglobinuria.

Therefore it seems probable not only that the urticaria of paroxysmal hæmoglobinuria is the result of toxic action induced by cold, but it appears likewise probable that the hæmolysis and the urticaria are due to the action of an identical toxic substance.

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Births and Deaths registered in Eight of the Principal Towns of Scotland during March 1906.

DURING the month of March 1906 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley Leith, Greenock, and Perth, the births of 4257 living children; of whom 2154 were males, and 2103 females. These births are 534 more than those registered in February, but are 224 fewer than those registered in March 1905. The birth-rate for the month amounts to 28.1 per thousand of the estimated population, a rate which is 0.9 more than that for the previous month, but 2.1 less than that for the corresponding month of last year. The birth-rate for the month was highest in Greenock, 33.0, and lowest in Edinburgh, 23.3. In Dundee it was 30.0; in Glasgow, 29.8; in Aberdeen, 28.7; in Leith, 25.1; in Paisley, 25.0; and in Perth, 24.9.

Of the total births, 311, or 7.3 per cent., were illegitimate. This illegitimate rate was for the month highest in Dundee, 9.3, and lowest in Leith, 2.3. In Aberdeen it was 8.7; in Edinburgh, 8.3; in Greenock, 7.6; in Glasgow, 7.0; in Perth, 6.8; and in Paisley, 3.8.

Deaths registered in these towns during the month numbered 2812, 1390 being of male persons, and 1422 of female persons. These deaths are 296 more than those registered during February, and 114 more than those registered in last March. The equivalent annual death-rate is 18.5, a rate which is 0.1 more than that of February, and 0.3 more than that of March last. The death-rate of the month was highest in Dundee, 23.3, and lowest in Leith, 14.5. In Greenock it was 20.3; in Paisley, 19.6; in Glasgow, 19.3; in Perth, 16.7; in Edinburgh, 16.5; and in Aberdeen, 15.1. In Glasgow, Aberdeen, and Paisley the death-rate was higher than that recorded in February; in Dundee it was the same as in that month; in Edinburgh, Leith, Greenock, and Perth it was lower than in that month.

Of the 2812 deaths, 908, or 32.3 per cent., were of children of less than five years; while 713, or 25.4 per cent., were of persons of over sixty. The former are 128 more than in February, and 47 more than in March 1905; the latter are 31 fewer than in February, and 25 fewer than in March of last year.

Deaths of children of under one year old numbered 532; these are 72 more than in February, but 11 fewer than in March last. The equivalent infantile mortality amounts to 127 per thousand births. The infantile mortality-rate for the month ranged from 210 in Dundee to 63 in Leith. In Greenock it was

143; in Glasgow, 131; in Paisley, 119; in Edinburgh, 110; in Perth, 100; and in Aberdeen, 91. In Glasgow, Dundee, and Greenock this rate was higher than what it was in the previous month; in the remaining towns it was lower.

Deaths from the principal epidemic diseases numbered 243; these are 47 more than in February, and 41 more than in March of last year. The equivalent annual death-rate from these causes is 1.6 per thousand. The death-rate from these causes ranged from 3.0 in Dundee to 0 in Perth. In Paisley it was 2.3; in Leith, 2.0; in Glasgow, 1.8; in Edinburgh, 1.1; in Greenock, 1.0; and in Aberdeen, 0.4.

There were no deaths from smallpox registered in these towns during the month. Deaths from measles numbered 113; these are 6 more than in February, and 81 more than in March of last year. Deaths from scarlet fever numbered 17; they are 7 more than in February, and 11 more than in March 1905. Deaths from whooping-cough numbered 50; these are 23 more than in February, but 67 fewer than in March of last year. Deaths from diphtheria numbered 29; they are 9 more than in the previous month, and 5 more than in the corresponding month of last year. There was 1 death from typhus fever and 10 from enteric fever; the latter are 3 fewer than in February, but 2 more than in March of last year. Deaths from diarrhœas numbered 23, and from influenza 21.

Deaths from puerperal septic conditions numbered 9; from malignant disease, 150, of which 84 were ascribed to carcinoma, 6 to sarcoma, and 60 to cancer not otherwise defined. Deaths from heart disease numbered 245; from apoplexies, 140; from premature birth debility, 82; and from alcoholism, 10.

Deaths from pneumonia numbered 298, and constituted 10.6 per cent. of the total deaths; while those from bronchitis numbered 253, and constituted 9.0 per cent. of the total. The former are 49 more than in February, and 10 more than in March 1905; the latter are 12 fewer than in February, but 31 more than in March 1905.

Deaths from tuberculous diseases numbered 389, and constituted 13.8 per cent. of the total; these deaths are 55 more than in February, and 12 more than in March of last year.

To violent causes 97 deaths were ascribed; of them, 8 were suicidal, 5 being by hanging, and 1 each by cut-throat, drowning, and poison.

Of persons dying during the month, 3 males and 7 females were aged ninety years or more. The oldest of them were four widows each aged 92.

Obituary

Dr Jessie MacGregor

WE regret to announce the death at Denver, Colorado, U.S.A., on the 22nd of March, of Miss Jessie MacLaren MacGregor, M.D., L.R.C.P. & S.E. The cable message announcing the fact intimated that the cause of death was meningitis, and subsequent letters, which have now reached some of her friends, state that it was of the cerebro-spinal type, and that it supervened upon an attack of tonsillitis. The course of the illness was one of startling rapidity. The week before her death she was in apparently good health. On Sunday the 18th, after exposure to chill from inclement weather, there was a rigor. In the early hours of Monday she was wakened by a headache of such severity as to make her suspect meningitis. By the afternoon of the same day, unconsciousness, from which she never rallied, supervened, and she died on the evening of the 22nd. The diagnosis of cerebro-spinal meningitis had been confirmed by lumbar puncture.

Although it was only a few months since Dr MacGregor had settled in Denver, she had already begun to make her mark there. At the time of her death she was acting as assistant to the Professor of Physiology, and so highly was she esteemed by her pupils that they insisted on carrying her remains to their last resting-place. The church in which the funeral service was held was filled to the door.

The physician who attended her writes: "When I realise that Dr MacGregor has been here only since last July, the place which she has taken seems marvellous. I cannot begin to tell you how her loss is mourned—you know better than we with what reason." While Dr Henry Sewall, the Professor of Physiology, says: "A brilliant career was already opening to Dr MacGregor in Denver, and I do not expect to see another who will so quickly win affection and respect."

Dr MacGregor was one of the first group of women students at the Surgeons' Square School of Medicine, and while maintaining herself by her own industry, she was able to take the highest places in all her subjects of study. When an opportunity presented itself of graduating in Medicine, she passed all her professional examinations within the shortest possible period, and was one of the first women to graduate as Bachelor of Medicine in 1892. Three years later her thesis for the M.D. degree, on "Comparative Anatomy of the Auditory Nerve," was considered worthy of a gold medal. She early developed

leanings towards gynæcology, and in order to increase her knowledge she studied for a season at Paris under Pozzi. She held the post of Assistant Gynæcological Surgeon to the Hospital for Women and Children at Bruntsfield Place, and she was one of those instrumental in founding the Hospice, a nursing home for poor women and children in the High Street. She was one of the first women members of the Obstetrical Society, and communicated several papers to its *Transactions*. Last year she published a book on the "Pathology of the Endometrium," which has been favourably reviewed by the medical press.

Dr MacGregor's departure for Denver last year took many of her friends by surprise, and was the source of keen regret to them and to her patients. It was felt that she had established for herself an assured position, not merely as a practitioner, but as a scientific worker. She, however, had long had leanings to go to America to be near the rest of her family, and when circumstances arose which made her consider it her duty to cross the Atlantic, she did not hesitate between this call and her own interests. Her friends were rejoiced to hear that prospects of work and usefulness had already begun to open up for her in her new home, and the announcement of her death has come upon them like a bolt from the blue. A. B.

Meetings of Societies

Edinburgh Obstetrical Society

THE Society held their fifth meeting of the sixty-seventh session on Wednesday, March 14—the President, Dr J. W. Ballantyne, in the chair.

Several Fellows exhibited specimens. Among those exhibited for Dr Brewis were: (1) a malignant papilloma of the ovary, (2) an early ovarian dermoid, (3) a large and interesting cervical fibroid removed by pan-hysterectomy.

Dr Haultain showed: (1) a large gravid fibro-myomatous uterus. The uterine tumours had been diagnosed before pregnancy began, but, as the patient was anxious to have children, operative interference was delayed in the hope of getting a viable fœtus by Cæsarean section. Owing to sudden severe pain over one of the fibroid masses it was decided to perform hysterectomy, though the pregnancy had only advanced five months. On section the part of the tumour which had been the seat of pain was found to exhibit early red infarction. (2) A

uterus removed for post-climacteric hæmorrhage from a patient æt. 55. On section the uterine wall was found to be the seat of fibroid nodules, both interstitial, sub-peritoneal, and sub-mucous, while in the uterine cavity was found a soft necrotic mass, which on section proved to be a round-celled sarcoma.

Dr Haig Ferguson showed: (1) an obstetric bag, the feature of which was a separate compartment for a steriliser; (2) a hydatid mole, retained *in utero* for ten months; (3) the puerperal uterus described in his paper.

Dr Fordyce exhibited: (1) an ovarian tumour whose symptoms had closely simulated the symptoms of renal calculi; (2) a uterus removed from a patient who ten years previously had had double oophorectomy performed for pelvic pain, but without any improvement in her condition. After hysterectomy her symptoms disappeared, and she regained her normal health.

Dr Haig Ferguson then read to the Society his paper on "Abdominal Hysterectomy for Acute Puerperal Metritis (multiple abscess in the uterine wall) and Acute Salpingitis, with Record of a Successful Case." Dr Ferguson first touched on the general question of cœliotomy in puerperal infection, stating that the indications were distinctly limited, as at least 90 per cent. of such cases yield to local or general treatment of a less radical nature. Dr Ferguson regarded the treatment as indicated where all other means of treatment is failing, where the foci of mischief are in the uterus and are not accessible by any other route, and where there is no source of infection beyond the uterus. In deciding on suitable cases one must take advantage of the information got both from a leucocyte count and from the glycogenic reaction. While agreeing that the great proportion of cases with a high temperature, rapid pulse, and fœtid discharge yield to intrauterine douching and curettage, Dr Ferguson stated that there always remained a certain percentage of cases where benefit might be got from an exploratory laparotomy, the operator being at the same time prepared to carry out any further interference which the conditions found in the abdomen seemed to indicate. The vaginal route he regarded as only indicated in pelvic abscess where evacuation and drainage is desired. Vaginal hysterectomy is contra-indicated owing to the friable condition of the uterus. As regards the results of cœliotomy for puerperal septic cases, there is at present a mortality of about 50 per cent.

Dr Ferguson's case occurred in a vi-para, æt. 25, delivered by a midwife after only two vaginal examinations. Patient was up on the eleventh day, though there had been some pelvic pain and a right-sided swelling four days after delivery. On the eighteenth day of the puerperium there was pain and a distinct rigor, temperature rose to 102° F. and pulse to 130.

A blood examination showed leucocytes 24,000, chiefly polymorphonuclear, no organisms in blood. A distinct glycogen reaction was got. The symptoms improved slightly, but on the twenty-third day the condition became so grave that Dr Ferguson decided to perform cœliotomy.

On opening the abdomen the intestines were found matted together with some imprisoned fluid. There was no general peritonitis. The omentum was œdematous, and was attached to the right side of the uterus. The right tube showed signs of acute inflammation. The uterus had a gangrenous appearance. Hysterectomy was performed. The patient made a most satisfactory recovery, pulse and temperature being normal on the fifth day. On examination of the uterus, intramuscular abscesses were found in the region of the right cornu. The endometrium was healthy, the right tube and broad ligament had marked signs of acute inflammation.

The President, Drs Barbour, Haultain, and Fordyce made remarks on the paper, and Dr Ferguson replied.

Dr Haultain then presented to the Society his paper entitled "A Clinical Experience of Ectopic Pregnancy and Allied Conditions."

After describing amenorrhœa, irregular hæmorrhages, pain, and the passage of a uterine cast as the classical signs and symptoms upon which a diagnosis might be founded if all four were present together, Dr Haultain proceeded to analyse his series of twenty-three cases in their relation to the classical symptoms.

In five of the series, amenorrhœa was absent. In four there were no irregular hæmorrhages. In four there was no pelvic pain. In sixteen there was no passage of any cast. In regard to differential diagnosis, Dr Haultain stated that in his experience ectopic pregnancy had been confounded with an ovarian dermoid, with pregnancy associated with an ovarian cyst, with a bi-cornuate uterus, and with simple early abortion. From the difficulty of certain diagnosis it frequently occurred that the patient was only seen after a severe hæmorrhage had taken place or while it is actually going on.

In regard to the source of the hæmorrhage, Dr Haultain suggested that, keeping in view the insecure attachment of the ovum to the wall of the tube, it might in some cases come from the tube, consequent on partial separation of the ovum. In cases of hæmorrhage into the tube there were, Dr Haultain stated, three possibilities: either the blood may pass from the tube to the uterus, or from the tube into the abdominal cavity, or failing to escape in either direction, it may distend the tube, leading to pain and then to rupture. Where there is intra-

peritoneal bleeding or rupture, there is as a rule pain, in many cases referred to the epigastric region. This is usually associated with shock and fall of body temperature.

Dr Haultain cited two of his cases in which he had found complete tubal deciduæ in the opposite tube to the one which was the seat of the gestation. Dr Haultain also had met recurrent ectopic gestation in four of his series of cases. In one the patient had a recurrence in the opposite tube within nine months. In a second case there was recurrence within eighteen months. In two other cases a ruptured tubal sac was found on one side and the remains of a gestation on the opposite side. In reviewing the treatment, Dr Haultain was of opinion that in all cases where there was a reasonable certainty as to diagnosis, removal was indicated. If left *in situ* the tube at best was, as a rule, occluded and functionally useless, while, on the other hand, so long as it contained a growing ovum, it was a constant menace to the patient's life, as a secondary rupture might take place at any time, which might prove fatal, or might necessitate operative interference in disadvantageous circumstances.

Drs Barbour, Haig Ferguson, and Lackie made remarks on the paper.

Glasgow Obstetrical and Gynæcological Society

THE sixth ordinary meeting was held on Wednesday, March 28 —the President, Dr J. K. Kelly, in the chair. The following fresh specimens were exhibited :—

1. Dr Robert Jardine showed a uterus removed from a patient at a second Cæsarean section; the cicatrix of the first operation was hardly visible; adhesions to the bladder existed.

2. Dr John Lindsay demonstrated a fœtus amorphous anidens from a cow.

3. Dr Louise M'Ilroy showed microscopic sections of a sarcoma of the Fallopian tube.

4. The President exhibited: (*a*) a sarcoma of the uterus ulcerating through the mucous membrane; (*b*) a fish-bone in the cortex of the ovary.

5. Dr A. S. Wilson read notes on three cases of interest. (*a*) The first was that of a young ii-para who was attacked by apoplexy. While six months pregnant she became suddenly unconscious during the night, no history of previous ill-health being obtainable. First a convulsive attack was noted, followed by coma, vomiting of dark-coloured fluid and incontinence of

urine; on examination, no œdema was found, nor any paralysis. Labour was induced, and the usual remedies for eclampsia employed. The coma deepened, the left arm and leg became paralysed, the urine was suppressed, and death occurred on the fourth day. (*b*) The second case was that of a child, who at first showed distension of the nasal bones, with projection of a cystic portion of tumour from the right nostril. A soft mass, covered with skin, filled the mouth, and projected forward, pressing the tongue out of sight. The tumour was found to be growing from the naso-pharynx, and was attached to the base of the skull. It filled the nasal cavity, and passed through a large cleft in the palate by means of a pedicle, afterwards expanding in the mouth into a bilobed mass the size of an infant's fist. The tumour was removed by operation, but the child died on the ninth day. Microscopic report by Dr Duff showed it to be composed of definite dermoid structures. (*c*) Dr Wilson also read a short note on the influence of paternity on a case of twin-bearing. A patient gave birth to triplets, followed in thirteen months by twins. On the husband's side twins occurred twice in his mother's family, and the wives of five uncles each had twins. A short review of recorded cases was given.

The cases were discussed by Drs Jardine, Caskie, Duff, and the President, and Dr Wilson replied.

5. Dr Jas. Weir read a short paper on the "Resuscitation of apparently still-born children." In his opinion the subject was inadequately treated in text-books of obstetrics, yet it was one having a definite bearing on the question of infantile mortality. The influence of chloroform was slight unless the operative treatment of the mother was prolonged. The speaker used A.C.E. or C.E. mixture himself, as being less injurious to the child. For artificial respiration, Schultze's method was the best, as, in addition to the movements, the child's skin came into contact with the air. Stimulation of the sphincter ani by the finger inserted into the rectum was often a good way of bringing about attempts at respiration. It was, in addition, a guide to the amount of vitality present, a tight sphincter being of good omen. Dr Mackellar briefly discussed this paper.

Forfarshire Medical Association

THE last ordinary meeting for the present session was held in Dundee on the afternoon of Friday, April 6th—Dr Sinclair, President, in the chair.

Mr Greig showed a man, aged 68 years, after operation by evagination of the testicle for large double hydrocele, with a

stereoscopic photograph of the condition before operation. He emphasised the simplicity and safety of the operation, and expressed surprise that the certainty of a radical cure had not led to a more general appreciation of its merits.

Mr Greig also showed an infant who had at birth an occipital meningocele larger than its head. The cyst collapsed at birth, but soon refilled, and at the age of five and a half weeks he successfully removed the tumour. A stereoscopic photograph of the condition at the time of operation was exhibited, and the actual tumour demonstrated.

A third case shown by Mr Greig was one of morphœa of the right forearm, associated with contraction and atrophy of the muscles in the upper half of the limb attached to the external condyle of the humerus. The patient was a woman of 80, and had a history of only slight injury. The hand was in good condition, though no pulsation could be felt in any of the vessels at the wrist, and the affection seemed to implicate the musculocutaneous nerve in its distribution to the skin and the musculospiral nerve in its distribution to the muscles, and the radial as regards sensation. Mr Greig expressed the opinion that the condition was primarily a nerve affection, and pointed out the incongruity of the distribution with a vascular derangement.

Professor Kynoch showed a specimen of carcinoma of the uterus removed by vaginal hysterectomy from an unmarried woman aged 56. The disease, which had been confirmed by microscopic examination, was confined to the endometrium. In contrast to this was a specimen of carcinoma in which the whole body of the uterus was involved except a small part at the fundus. A third uterus which showed a condition of diffuse adenoma of the endometrium with a suspicious character on microscopic examination had also been removed by vaginal hysterectomy. He also showed an ovarian cyst with torsion of the pedicle which had produced symptoms calling for immediate operation in a young multipara fourteen days after a normal confinement. A fibroid removed from the anterior wall of the uterus after a previous operation by removal of the appendages which had no effect in checking the excessive hæmorrhage—the most prominent symptom—was also shown. The second operation was successful in giving relief.

Professor MacEwan read a paper on the "Local Treatment of Surgical Tuberculosis." In introduction he emphasised the importance of constitutional as an adjunct to local treatment, and pointed out the desirability of extending the modern sanatorium method to the hospital class of cases, and stated that the natural tendency to cure of tuberculosis in bone and joints was probably greater than in pulmonary tuberculosis. In many

cases he considered it advisable to combine the open-air treatment with complete bodily rest in the recumbent posture, as well as using methods to obtain complete rest for the affected parts. By the aid of lantern-views he demonstrated what he considered to be the best methods for securing that immobilisation and the prevention and correction of abnormal attitude in spine and hip disease. He was of opinion that in tuberculosis of bones and joints, better results both as regards life and function were as a rule obtained by conservative than by operative means. In non-suppurative joint cases parenchymatous and intra-articular injections of iodoform gave good results. Mixed infection with pyococci was a complication to be dreaded and carefully guarded against, hence abscesses should not be opened but aspirated and then injected with iodoform, naphol-camphor, or other modifying substances.

He contrasted the methods of incision and drainage with that of aspiration and injection, and pointed out how it was almost impossible in many cases where there was a great deal of discharge, however careful one might be in the dressings, to entirely exclude other organisms. Mixed infection resulted in greatly delayed healing, and frequent formation of fistula. With the closed method of treatment a cure was almost certain.

He described his method of procedure in various cases, exhibited the syringe he employed and explained its working, and enumerated various precautions which were necessary for success. It was essential always to choose a spot for puncture where the skin appeared to be quite normal; the skin must be thoroughly disinfected, and the needles and syringe sterilised; it was advisable also to soak the iodoform in carbolic solution before use. He preferred to use iodoform 10 per cent. in ether, with sometimes a little glycerine or guaiacol.

During the past three years he had treated forty-four cases of "closed tuberculosis"—in thirty-four of which bones or joints were affected—by injection, or by aspiration and injection. These included cases of tubercular periostitis of jaw, spinal caries with abscess in the neck, caries of rib, scapula, and ilium. Arthritis of elbow, wrist, ankle, hip, and knee, several cases. Six cases of psoas and two of lumbar abscess, etc., etc. In three cases the treatment failed; two improved but died afterwards of phthisis; in forty-one the results were satisfactory. During that period no tubercular abscess was opened, and thus no patient exposed to the risk of mixed infection. He considered that the results thus obtained were most encouraging and a great improvement on former methods and worthy of a more extended trial in the future. In advanced cases of bone disease with sinuses he had employed Von Mosetig-Moorhof's

method of clearing out the cavity and packing with iodoform paste, with a considerable amount of success.

In the discussion which followed, Dr Halley objected to the opinion expressed by other members that the results of the treatment were convincing, as he considered in many cases time could have been saved and the disease with more certainty eradicated by excision of the affected parts. The majority of the meeting, however, were of opinion that the new method of treatment was a great advance on that of former days.

Editorial Notes and News

On Some Varieties of Hospital Abuse.

HOSPITAL abuse is a subject which is popularly supposed to be of little concern to anyone but medical men. And, indeed, if the public find that their charitable contributions provide "advice gratis" to a far larger number of sick persons than they had any right to expect, there seems no reason why they should grumble. Nor can it be expected that the governing bodies of hospitals and dispensaries should be over-zealous in limiting the scope of their institutions to the really poor, at any rate so long as the latter do not suffer by the wider diffusion of medical aid. Indeed, the annual reports of such institutions bear witness to the fact that an increase in the number of patients from year to year is looked on as a proof of efficient management, and a ground of appeal to the public for larger contributions. Yet it should be evident that an increase in the number of patients treated by charitable institutions, much beyond what can be accounted for by the increase in population, is not, from the social point of view, altogether a matter for rejoicing. Such an undue increase must mean one of two things. Either the poor are getting poorer, or numbers of people are seeking for medical charity who in former years were in the habit of providing for themselves.

That poverty is increasing and becoming more widespread there is no evidence whatever. The poorer classes are distinctly better off, and moreover much healthier, than was the case a generation or two ago. On the other hand, there is ample evidence that medical waiting-rooms are to-day frequented by large numbers of patients of a class which should be able to provide for itself in all ordinary cases of sickness. That this is so is not perhaps so much the fault of the patients as of the

institutions concerned. The fact may be regretted, but a fact it undoubtedly is, that human nature, whether in the hospital patient, or in the Carnegie student, has no innate aversion to receiving something for nothing when the opportunity occurs. Accordingly, when benefits are freely offered with no more than an implied restriction as to the necessities of the recipients, it cannot but happen that abuses will creep in.

Hospital abuse of this kind undoubtedly presses most directly upon the medical profession, and especially upon the younger members of it, who naturally find the bulk of their practice amongst those who can afford to pay only small fees. But the question is really one of much more far reaching importance, for there can be no doubt that the provision of indiscriminate medical relief has in its degree the same tendency to diminish thrift, self-reliance, fore-thought, the sense of responsibility, and other social virtues, which all economists recognise as the invariable outcome of indiscriminate charity in general.

Our present subject, however, is not the *evil* of hospital abuse, but its varieties. The use of charitable medical institutions by those who should be self-dependent is only one form which abuse takes. The absence of any sort of preliminary inquiry when a patient presents himself for treatment brings about another form of abuse; namely this, that it by no means uncommonly happens that when a patient fails to get immediate and striking benefit from the course of treatment advised, he goes from one out-patient department to another, instead of persevering with the treatment originally prescribed. The result of this is that the time of several physicians is wasted, and that the patient fails to get the relief he seeks, and very probably loses his faith in medical treatment altogether. Other patients of this kind become the chronic "hospital birds," which are known in every waiting-room. A medical friend who, some time ago, held several appointments in Edinburgh and Leith, informs us that he has been consulted in different places by a single patient three times in one day. We ourselves met with a case lately where a child was suffering from debility after measles, with slight conjunctivitis, and a little eczema on the forehead. In the course of about three weeks this child was under treatment at one of the public dispensaries, at the Victoria Dispensary in Lauriston, at Chalmers' Hospital, at the Sick Children's Hospital, at the Medical Out-patient Department in the Infirmary, and at the Eye and the Skin Departments of the same Institution. The mother declared that it was quite evident the doctors could not understand the case, as they all ordered different treatment, and as no form of treatment was persisted

in for more than two days, it is little wonder that the child failed to improve.

There is another class of patient whose conduct is the very opposite of that just described. These patients, even when seriously ill, fail to seek the advice which would be freely given to them, often until it is too late for any good to be done. It is, perhaps, not altogether a misuse of language to regard such cases as examples of a kind of hospital abuse. For example, a friend was called the other day to see a girl who was the sole support of her mother and a younger sister. The girl was found to be suffering from advanced phthisis, of which she died within ten days of being first visited. Yet this girl, although she had been suffering from cough and progressive emaciation for over a year, had had no medical treatment of any kind until she became too weak to get out of bed. Within two or three minutes' walk of where she stayed there are not less than five institutions, at any one of which she might have obtained treatment gratis.

We fear that a certain amount of hospital abuse must be laid at the door of the medical profession. Consultants who hold teaching appointments naturally like to have a sufficient amount of "material" to illustrate their lectures and cliniques, and if patients apply for their advice who are scarcely of what is sometimes called the hospital class, they are often quite frankly glad to see them, and encourage them to continue in attendance. It has sometimes been argued that patients who are used as subjects for lecture or demonstration should not be considered to be in receipt of charity, inasmuch as they give something in return for the advice they receive; and as for the consultant, it must be admitted that it is not his duty to act the part of inquiry officer. None the less the encouragement of interesting cases to continue in attendance at hospital must be held responsible for a certain amount of abuse. But the consultant must not be made the scapegoat for the sins of the profession. The general practitioner does most of the grumbling which this question gives rise to. But we think we have heard rumours that even he occasionally finds the hospital a useful means of relieving him of a troublesome patient who requires a good deal of attendance, and who—is a member of his "club."

Hospital abuse, then, is somewhat protean in its aspects, and we hope we have said enough to show that it is more than a mere doctor's question. In any discussion of the means by which abuse may be limited, the different aspects of the subject should be kept in view. From the social point of view it is of the utmost importance that adequate medical attendance should be within the reach of all who need it, and when hospital abuse

has ceased to be a subject of controversy, we believe that the benevolent work of hospitals and dispensaries will still have ample scope.

Sir Henry Littlejohn.

WE can hardly remember a proposal to present a portrait being so heartily received as that to which we now refer. So hearty is the response that it has been found necessary to restrict the subscriptions to one guinea. The Committee which has charge of the arrangements comprises:—The Principal, Lord Stormonth Darling, the Presidents of the Royal Colleges, Drs John Smith, Joseph Bell, G. A. Gibson, and Francis D. Boyd, the latter of whom will act as Secretary. Subscriptions will be received by Mr RAMSAY, Royal Bank, Forrest Road.

The Royal Infirmary.

DRS HAIG FERGUSON and W. Fordyce have been appointed by the Managers Assistant Gynæcologists, and they will, we are glad to hear, be expected to take an active part in the rearranged teaching of the department. It is a significant sign of the times that the runner-up in the voting was Mr Scott Carmichael, who at present holds the post of Assistant Surgeon to the Royal Hospital for Sick Children. In the new clinical school just started in London the medical and surgical diseases of women are made separate charges. We learn with great satisfaction that a further extension of the co-ordination of the teaching in the Infirmary is to be looked for in the near future, and that all the surgeons in charge of wards will be recognised as University Lecturers in Clinical Surgery. We have never accepted all the criticism launched by interested parties at Edinburgh Surgery, but there is no denying the fact that its repute did not stand so high as that of its Medicine. Under the stimulus of this new extension the physicians will have to look to their laurels.

Aberdeen University Union.

MRS PHILIPS has founded a reference library in connection with the Union in memory of her husband, the late Dr C. D. F. Philips. The value to the students of such a library is very great: it is impossible for them to buy all the books they might consult with advantage; and a taste for reading is one of the most valuable things for a student to cultivate. Professors Cash and Stockman, Dr Murrell, and others have already presented books, and there must be scores of Aberdeen graduates throughout the world who will gladly imitate their example.

Royal College of Physicians of Edinburgh, Royal College of Surgeons of Edinburgh, and Faculty of Physicians and Surgeons of Glasgow.

THE Quarterly Examinations of the above Board, held in Edinburgh, were concluded on 11th inst., with the following results:—

First Examination, Four Years' Course.—Messrs Richard Burrows Sephton, Culcheth, and Tirunarur Arunachala Ramaswami Aiyar, Tirunarur, passed the examination.

First Examination, Five Years' Course.—Of thirty-two candidates entered, the following nineteen passed the examination:—Harry Ellison, Manchester; Richard Dorset, New Zealand; Walter Crosse, Liverpool; Herbert Christian Bankole-Bright, Sierra Leone: Richard Parry, America; Baldev Singh, Lahore; John William Hitchcock, Suffolk (with distinction); Harold Gordon Chouler, Port Elizabeth; Ralph Christopher Fuller, Co. Cork; Hugh Clement de Souza, Rangoon; Ernest Justin Vaillant, Rangoon; Dakshina Ranjan Das Gupta, Calcutta; George Nicol Groves, Leith; Henry Ernest King Fretz, West Indies; Gordon Beveridge, Dunfermline; Donald Morrison, Argyleshire; Charles Gordon Timms, Melbourne; Arthur Lidgey Salmon, Truro; and Munchersha Byramji Irani, Bombay; and four passed in Physics, three in Biology, and one in Chemistry.

Second Examination, Four Years' Course.—Mr Aiknath Visajee Bam, Hyderabad, passed the examination.

Second Examination, Five Years' Course.—Of nineteen candidates entered, the following six passed the examination:—Louis Nathaniel Robertson, Trinidad; Samuel Middleton Ware, Melbourne; Daniel Murphy, Castleisland; Ishmael Charles Pratt, Sierra Leone (with distinction); Frederick Robert Watson, Sydney; Edward Peake Maitland, India; Thomas James George, Wolverhampton; and John Patrick Synnott, Ireland; and three passed in Anatomy, and one in Physiology.

Third Examination, Five Years' Course.—Of thirty-six candidates entered, the following twenty-six passed the examination:—James Haig Johnston, Fifeshire (with distinction); Andrew Johnstone Brown, Edinburgh; George Hector Urquhart, Eskbank; Owen Thomas Jones, Anglesea; William Taylor, Ballymena; Percival Thomas Rutherford, Shipley (with distinction); Oliver Carlyle, London (with distinction); Joseph Henry Bennett, Co. Cork; William Roberts Ellis, Bala; George Whitfield Knipe, Co. Tyrone; Charles Liston Stewart, India; John Albert Henry Müller, India; John Henry Morris-Jones, Wales (with distinction); Jane Hall Filshill, Scotland; William

Francis Gordon Scott, Bombay; Arthur Patrick O'Connell, Sangor; Khorshed Sorabji Kanga, Bombay (with distinction); Michael Joseph Hayes, Rosscarbery; Cecil Berry, Wigan; Dora Robbins, Poona; Secossene Piarroux, Mauritius; Cowan Jones, Co. Down; Peter Stewart, Uphall; Munchersha Byramji Irani, Bombay; Jitendra Nath Rai, Punjab; and Vinayak Shantram Sanzgiri, Bombay; and one passed in Materia Medica.

Final Examination. — Of thirty-eight candidates entered, the following sixteen passed the examination and were admitted L.R.C.P.E., L.R.C.S.E., and L.F.P. & S.G.:—Sibyl Caridwen Bevan, New York; Sidney Nix, London; James Stirling Macdonald, Cape Colony; Henry Traill Simpson, Leith; George Whitfield Knipe, Co. Tyrone; J. E. Syme, England; George Julius Congdon, Woolwich; Fred Yates, Burnley; Frank Valentine Woodbury, New York; Arthur Washington Thomas, Toronto; John Charles Grant, West Boldon; Gertrude Ellen Austin, London; Maude Conway, Bombay; Alexander Sydney Campbell, Dundee; Waldo Brock Clarke, Schomberg; and John Stanislaus Bruggman, Melbourne; and eight passed in Medicine and Therapeutics, ten in Midwifery, and eight in Medical Jurisprudence.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

DISEASES OF CHILDREN

By W. B. DRUMMOND, M.B., C.M., F.R.C.P.,
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I. Carbohydrates in the Diet of Children.

A. Starchy Food in Infancy.—Kerley and Campbell (1) of New York have made a series of observations on the stools of infants to whom starchy food was administered. The children's digestive capacity for starch was gauged by means of the iodine or von Jaksch test. The observations at present published cover 166 examinations made on 30 children, all under one year of age. Of the 30 cases, 23 showed a good starch capacity. Of these, 11 had diarrhœa. Of the 7 who had a poor starch capacity, 1 was eight days old, the other 6 had diarrhœa. In 16 children the examinations were persistently negative to

starch. Of these, 11 were six months old or older, and 5 were under six months. Among those under six months, 1 was nineteen days old; he took 142 grains of starch daily, the stool being negative to the two examinations made on two successive days. One was five months, twenty-six days old. He was given 375 grains daily. Five examinations were made, all being negative. To test his digestive capacity, 1560 grains were given for two days. The stools failed to respond to the iodine test.

These observations are insufficient to base any very far-reaching conclusions upon, but they indicate that further experiments extending over a longer time might be worth carrying out.

Roux (2) of Cannes has also published an essay dealing with the use of farinaceous food in nurslings. He accepts the general teaching that only very minute quantities of starchy foods may be given between the sixth and the ninth month; small quantities only from the ninth to the twelfth month; and that relatively large quantities may be given after the end of the first year. He then proceeds to discuss the question how much farinaceous food may be given. He maintains that if farinaceous food is given it should be substituted for an equivalent amount of milk, a coffee spoonful of farina, or six grammes, being substituted for 25 or 30 grammes of milk. The following table is given as an indication of the line of feeding which might be adopted in suitable cases.

For a child of 8 kilogrammes (about nine months): 6 feedings of 100 to 120 grammes of milk, and one of 80 to 90 grammes of milk plus a coffee spoonful of farina.

For a child of 9 kilogrammes (about a year): five feedings of 135 to 145 grammes of milk, and two of 110 to 120 grammes of milk with a spoonful of farina.

For a child of 10 kilogrammes (about 14 months): 4 feedings of 145 to 175 grammes of milk, and three of 110 to 120 grammes of milk with two spoonfuls of farina.

The dietetic value of farinaceous food is next discussed. The first point noted is that its caloric value is enormous as compared with that of milk. One hundred grammes of milk average 72 to 75 calories, while one hundred grammes of farina (flour, barley, rice) give an average of 350 to 380 calories.

Farinaceous food also has a distinct value in diminishing the fermentation of the curd. This is attributed to the more prolonged production of lactic and succinic acids during the digestive process than when milk alone is given. At the same time the starch given must be within the digestive capacity of the child.

As regards the choice of particular forms of farinaceous

food for infants under fourteen months, the author would use only those which consist almost entirely of starch, such as sago, arrowroot, and rice. These contain about 80 per cent. of starch.

Next he would make use of those which, while rich in starch, contain a fair amount of albuminoids, such as barley, rye, wheat flour, maize. These are especially indicated during the second year, and should be varied from time to time.

A third variety of farinaceous foods includes those which are rich in starch and albuminoids, such as peas, lentils, beans. These contain 50 per cent. of starch and as much as 25 per cent. of albumen. They should not be used until the third year.

The farina to be used should be mixed with a little cold water and dried in an oven or on a girdle. The necessary quantity should then be stirred into hot milk and boiled for six to ten minutes.

B. Carbohydrates in Older Children.—It is generally admitted that the proportion of proteid in the diet of growing children should be greater than in the diet of adults. But children require also a large amount of carbohydrates, the total amount being greater in proportion to the body weight than that required by the adult. According to Hutchison (3), a child of five requires one-third as much carbohydrate as an adult man.

As a general rule the carbohydrates are readily assimilated, but occasionally this is not the case, and several writers have recently attributed various affections of children to defective carbohydrate metabolism. Thus Dr Francis Hare (4) points out that there must normally be a balance between the carbon income of the blood and the carbon expenditure.

The former process (carbonisation) depends upon the carbon intake and the efficiency of digestion and assimilation. The latter (decarbonisation) includes combustion, fat formation, and the formation of certain secretions (such as milk, sebum, bile) and a certain amount of direct loss, as from hæmorrhage. To the condition of balance in which the carbonaceous material of the blood is not in excess of the physiological requirements of the organism, the term pyremia is applied. If carbonaceous material accumulates in the blood to a pathological degree, the condition may be termed "hyperpyremia." What the exact constituents present in the blood may be is a matter for surmise. But hyperpyremia is different from hyperglycemia, inasmuch as the latter leads to glycosuria.

Dr Hare's theory is that many acute recurrent processes such as migraine, vomiting, asthma, major epilepsy, are means by which the organism gets rid for the time being of the recurring load of carbonaceous material in the blood. Some of these processes, such as attacks of cyclical vomiting, act by

restricting the intake; while others, such as asthma and major epilepsy, operate by increase of expenditure.

The same writer offers a somewhat different explanation (5) of the cases of recurrent pyremia with vomiting and unhealthy stools not uncommonly met with in children. In these cases he thinks there may be an accumulation of glycogen in the liver to such an extent that the portal capillaries get pressed upon and a mechanical congestion is induced in the mucous membrane of the alimentary canal. The congested mucous membrane swells up and blocks the openings of the common bile duct and the pancreatic duct. Digestion is interfered with, and nausea, vomiting, and perhaps diarrhœa occur. During the attack the liver cells are unloaded of their glycogen and their functions are then gradually restored.

Dr Eustace Smith (6), in an article on "Food Fever in Children," refers to the same class of case, but gives a somewhat different explanation. According to him these are really cases of acute gastric catarrh due to fermentation in the alimentary canal, and are often traceable to a definite chill. The patients suffer from cold feet, and consequently their resisting power is so feeble that they are prepared to suffer from a comparatively slight exposure.

Whatever the explanation of these cases may be, both writers are agreed as to the importance of restricting the starches and sweets in the diet. Hare summarises the treatment thus: restrict the intake of glycogen-forming material, especially the carbohydrates; increase the expenditure of glycogen, especially by physical exercise; avoid sudden cutaneous vaso-constriction by protection of the surface from chill.

In connection with the subject of cyclical vomiting in children, a paper by Morse (7) on "Acid Auto-intoxication in Infancy" may be referred to. While admitting that the carbohydrate metabolism may be at fault in some instances, Morse attributes to acid intoxication many cases of recurrent vomiting in children. He has studied the subject of acetonuria and diaceturia in children, and has come to the following conclusions:—

"The acetone bodies are not found in the urine of comparatively healthy infants and children by the ordinary clinical tests. They appear in their urine under approximately the same conditions as in adults. Certain disturbances of digestion associated with the presence of the acetone bodies in early life have peculiar symptomatologies. It is probable that the peculiar symptoms are due, in part at least, to acid intoxication. It is also probable that the acid intoxication is not primary,

but secondary. The connection of the symptom-complex seen in many cases of recurrent vomiting with acid intoxication is probably closer than in the digestive disturbances just mentioned. In these cases, also, the acid intoxication is presumably always secondary to some other abnormal condition, which may or may not be digestive in origin. In any event the etiology is obscure. In spite of the fact that the amount of the acetone bodies found in these conditions is relatively much smaller than those found in diabetes, the demonstration of their presence in connection with symptoms of gastro-intestinal disturbance and the symptom-complex of recurrent vomiting, and probably also with other conditions, is of importance both in diagnosis and treatment."

The main point in the treatment of these cases is to be on the outlook for premonitory symptoms, such as an odour of acetone in the breath, and then to begin immediately the free administration of bicarbonate of soda.

II. Measles.

The Control of Measles.—If the inoculation experiments of the first half of last century did nothing to diminish the incidence or to lower the mortality of measles, it cannot be said that the sanitary improvements of our own generation have proved any more effective. Measles still remains the most fatal disease of childhood. According to Dr Tatham (8), the corrected death-rate from measles in England and Wales per million persons living in the decennium 1891-1900 was 414, as compared with 406 for the decennium 1881-90.

Under the Edinburgh Health Act, measles was a notifiable disease, but when the city, a few years ago, adopted the Infectious Diseases' Notification Act of 1889, in which measles is in the optional list, the Health authorities decided to stop the compulsory notification of the disease on the ground that the expense was not justified by any diminution of measles epidemics.

It seems probable that the appointment of medical officers to schools will result in a better understanding of the means which should be adopted during the prevalence of the disease. At present opinion is very much divided as to the value of such measures as school closure, and there is no uniformity of practice as to the time at which schools are closed after the appearance of measles or the duration of such closure. Some light is thrown on the subject by an important report which has just been issued by Dr Kerr (9), medical officer to the Education Committee of the London County Council.

Two months after Dr Kerr's appointment the late School

Board approved of a scheme for a thorough inquiry in a limited area, to extend over a period of five years. The area selected was Woolwich. In one half of this district it has been attempted to suppress measles by rigorous class closure; in the other half individual exclusion is followed, and the schools are not closed if this can be avoided. The inquiry began in the autumn of 1902, and was conducted under the supervision of Dr Thomas.

The measles history of each child is kept on a card from the time of its entering the infant school. It was found that 50 per cent. of the children had measles before coming to the infant department, and 84 per cent. had it before leaving the infant school.

The importance of knowing the proportion of susceptible children in a class is very great, for Dr Thomas finds that measles tends to appear whenever a class accumulates unprotected members to the extent of between 30 and 40 per cent., and when spread has begun it continues until the proportion is reduced to between 15 and 20 per cent. unprotected. The spread is very much affected by the hygienic conditions in the schools. It is much less where there are large, airy class-rooms than where the rooms are close and crowded. Thus in two temporary schools which were badly ventilated, 81.5 per cent. and 90 per cent. of the unprotected children were attacked, in spite of immediate closure the moment measles was known to have occurred.

If closure is to do any good it must be carried out on the very first appearance of a case of measles. If it is delayed until after the appearance of the "first crop" it will do no good at all.

It is suggested that whenever a case of measles appears in a class, circulars should be sent to the mothers of unprotected children, asking them to look out for colds, and on the slightest appearance of symptoms to keep the child at home for a few days.

It is stated that measles *never* spreads in the boys and girls departments, and that there is no need to exclude children from infected homes who attend the upper departments.

Dr Kerr points out that much can be effected by an intelligent mistress, with hygienic instincts and training, to protect even babies' classes. The ultimate solution, he thinks, will probably be "seclusion of non-protected individuals, while it is very doubtful whether exclusion of children, themselves unaffected but coming from affected households, is required in any except the infant departments."

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MEDICAL JURISPRUDENCE

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Rape and Violence.—In a recent number of the *Gazette des Hôpitaux* (No. 21, 1906), Brouardel discusses some points of importance in this relation, especially so from the point of view of the general practitioner. In the first place, one may be asked the probable date of a criminal assault. If, says Brouardel, you have the chance (rarely met with) of seeing the victim very early after the outrage, with freshly lacerated and still oozing hymen, you will be able to assert that the crime was quite recently committed; if, however, eight days, perhaps, have passed, you can only say, from the appearance of the parts, that the attempt was a recent one, without defining the word recent too exactly.

Again, one must not say positively from local signs that a person has been raped. All one can really affirm is that defloration has been brought about by some foreign body corresponding in shape and size to the erected penis. In many cases there has been no crime, but a foreign object, like a carrot, has been introduced for some purpose into the vagina. Then there is the question of general injuries. These may be grouped as peri-genital, comprising all vulvar lesions, and the extra-genital, which embraces injuries to the face, arms, and legs. Hofmann draws attention to the fact that some women have a pair of pigmented lines or striæ at the upper and inner part of the thighs which are not unlike a bruise some eight days old. Injuries indicating biting, both peri- and extra-genital, are not uncommon in rape.

The examiner may be asked for an opinion as to whether, in fatal cases, death preceded or followed the criminal assault. Strangulation is the usual method employed by the criminal when murder is done to facilitate, and during the accomplishment of, the violation; if the victim is killed after the assault for the purpose of disposing of a victim, any means may be

employed. It is important to distinguish between the mark of a bruise and that caused by irritation of skin, post-mortem staining, and so on. Bruises are true extravasations, and if of any size require a fortnight or more for complete disappearance. They vanish more rapidly in the case of children ; and when on mucous surfaces are absorbed more quickly than on the skin. Bruises are not infrequently simulated for purposes of false charges. The marks are then usually produced by suction, and their form and edges generally are distinctive. Rubbing with nettles is sometimes tried, or the application of silver nitrate or other chemicals. The latter produce the appearance of old bruises, and may in some cases be detected in this way, their colour not corresponding to the date of alleged assault. In addition to genuine bruises, one may find spontaneous ecchymoses, especially in children and young women. In a certain number of cases these are purpuric spots, in others they are probably of neurotic origin, that is to say, "stigmata." A classical example of such marks, says Brouardel, is found in the life of St Francis of Assisi, who had a vision one night of the Saviour on the cross, and observed distinctly the blood-stained hands and feet. This made so great an impression on him that during the night he reproduced similar marks on his own hands and feet.

Another rarer complication may be the appearance of blood on the skin without a real lesion. The first description of such a case was in 1857, where a young girl accused someone of having given her a sharp blow on the head. Blood appeared quite distinctly, but no wound could be found.

As regards the consequences to the victim, rape may occasion syncope, nervous phenomena, or fever. The victim may terminate her mental sufferings by suicide. Pregnancy may follow, but any opinion on this point must only be given when one is perfectly certain. It is to be remembered that cessation of the menses and vomiting may occur as the result of emotion, and may mislead one. Hystero-epilepsy has been described as a sequel to the outrage ; and in girls between seven and fifteen, chorea has been known to develop. Where young children are the victims, and where submission is gained by fraud and not by force, the victim may, as a result of repeated acts, become weakly, anæmic, and ill-nourished, and menstrual disorders may arise. These general conditions are, of course, not diagnostic, and cannot in themselves indicate that rape has been repeatedly practised.

The Effects of Borax and Boric Acid on the Human System.—The views of Professor Liebreich of Berlin on the

boron compounds are well known, and we have a further restatement of them in a critical article just published, going over the work done in this field by Dr H. W. Wiley for the Board of Agriculture of the United States. The Secretary for Agriculture has initiated in that country a series of investigations into "The Influence of Food Preservatives and Artificial Colours on Digestion and Health," of which Dr Wiley's research on boric acid is the first. The investigations extended over a series of five, each with six persons, and the points investigated comprised the following: Body weight, appetite, number of blood-cells and amount of hæmoglobin, amount and composition of fæces and urine, metabolism in respect to nitrogen, phosphoric acid, and fat, oxidation of combustible matter in the food, excretion of solids, and influence on general health.

In some of the investigations uncertain results were obtained, from which no conclusion could be drawn, but the following results were pretty definitely made out: The body weight showed a slight tendency to decrease, the tendency partly disappearing, partly continuing in the after-period; the metabolism of nitrogen showed a slight tendency to a decrease in the excretion (more marked in the after-period); the metabolism of phosphorus showed a distinct tendency to an increase in the phosphoric acid output during the preservative period. Moreover, disturbances in appetite, health, and digestion occurred.

It is impossible within the space at our disposal to summarise in any fulness Professor Liebreich's exhaustive critique, which runs to 70 pages, but we may indicate a few of his views and arguments, and sum up his conclusions at the end. In the first place he considers the medical supervision of the cases much too perfunctory, and carried out at too great intervals. The suggestion was that the medical inspector should see the six cases once in ten days, each inspection of all six occupying two hours, thus making a call of only six hours per month on this expert's time. One of the persons selected suffered from diarrhœa during the Spanish-American war, and Liebreich is not satisfied that the diarrhœa noticed during the time of experimenting was not a continuation of this. He regrets, too, that animals were not more used, as he believes they are less affected by psychical influences, and are more suited for pharmacodynamical study, and he thinks the number of persons studied too small to permit of the exclusion of idiosyncrasies. Again, although the cases bound themselves to eat nothing during this period of trial except what was provided at the test-table, yet no strict supervision was kept over them, and thus a little carelessness or indulgence on the part of one would, in so small a group as six, make a considerable difference. A special dining-room

and kitchen were set aside at the laboratory for these trials, and a further objection raised is that the dining-room was apt to be unpleasant from the smell of chemicals and oils stored in apartments opening off it, which would almost certainly tend to diminish the appetites of even healthy young men.

Coming now to detailed criticism, Liebreich points out that errors have been committed with regard to the periods of observation. Dr Wiley very properly divided each series into a fore-period, a preservative period, and an after-period, the preservative part being again divided into four sub-groups. The necessary fore-period, to obtain metabolic equilibrium, is given as ten days, but this was not adhered to, the time in series i. being only six days, and in series iv. and v. eight days. Further, Dr Wiley points out that the preservative period, to yield good results, should extend from fifteen to twenty days, preferably the latter, but in series i. only thirteen days' observations were made. Another quite legitimate criticism is that the pre-period was devoted to finding how much rations were required for each subject to obtain a steady body weight, Dr Wiley stating that an excess of food produces a state of plethora. It is objected to this, with some reason, that ten days is much too short a time to determine either that a state of plethora was induced or to obtain a steady body weight, and that in any case constancy of body weight in such experiments is quite inadequate without obtaining at the same time constancy of excretions.

The boric acid was given in the form of gelatine capsules, a doubtful procedure where the wholesomeness of a food-ingredient was being studied, as a concentrated dose was introduced with the possibility of a rapid systemic absorption. No ill effects on the gastric mucosa could be observed. The next point under consideration is the nitrogen-metabolism, in which, unfortunately, the results are not quite reliable, as the experimented persons were not brought into a state of nitrogen-equilibrium before the preservative period. In the case of phosphoric acid it is still more difficult to obtain an equilibrium, and therefore still more dubious when one tries to draw conclusions from variations in excretion. The general opinion arrived at by Dr Wiley was that phosphoric excretion was increased by the ingestion of boron compounds, and Liebreich admits that if this were really the case it would be a serious matter, as it would indicate excessive waste of bone, nerve-tissue, and other phosphorus-containing tissues. He subjects Dr Wiley's observations to a very searching criticism (indeed a large part of the paper is taken up with this), and concludes that the investigator has made unwarranted deductions regarding the phosphorus-metabolism.

The conclusions he finally draws are, in general, that no in-

jurious effects can be ascribed by these experiments to the use of boric acid in food in the amount given, and that any malaise or indifferent health was due to the bad hygienic condition of the dining-room, and to the method in which the borax was given. In particular he states :—

1. That the alleged loss of weight was of no real value in the test, and in any case the amount (average loss of 680 grms.) was too small to be necessarily ascribed to influence of boron compounds.

2. That the experiments on metabolism were done with no equilibrium of nutrition.

3. The pre-periods were too short.

4. The percentages of nitrogen and phosphorus in the food were constantly changing.

5. As a result of this one could not say that the excretion increased during the preservative period.

6. Phosphoric acid elimination is calculated in percentages, a mistake when the supply of the acid is not constant.

7. No true relation can be traced between the amount of elimination of the acid, and the magnitude of the dose of preservative or days of the preservative period.

8. The hygienic conditions of trial were not perfect.

9. The medical and self-supervision were inadequate.

10. The method of administration (in capsules) is not comparable to that where boron bodies are mixed with food.

11. No lasting injury resulted in any case; in spite of transient disturbances, the persons tested said they felt better physically at the end of the seven months of trial than they had been before.

PATHOLOGY

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ON OPSONINS AND VACCINE INOCULATIONS

WITHIN recent times there has certainly been no more important contribution to scientific medicine than the work of A. E. Wright and his pupils on opsonins and vaccine inoculations. Wright and his co-workers, by the introduction of ingenious and accurate technical methods, have opened up new fields in the scientific study of immunity, and have shed a fresh light on the elucidation of the factors involved in phagocytosis. But while it must be admitted that much controversy and diversity of opinion

have already arisen as to the scientific interpretation of the results thus obtained, still the important fact remains that the discoveries of Wright are destined, from their wide therapeutic applicability, to offer in the future the most hopeful results in the treatment of diseases due to bacterial infection. Since the introduction of the antitoxin treatment of diphtheria by Behring and Kitasato, there has certainly been no discovery of such far-reaching importance as regards its therapeutic applicability than the vaccine treatment of bacterial infection as devised and carried out by Wright. And already Wright and his pupils, with the aid of the accurate technical methods devised by them for the quantitative estimation of the protective substances in the patient's blood, have obtained most encouraging results in the vaccine treatment of tuberculosis and staphylococcic infections.

For the proper appreciation of the recent work on opsonins and vaccine inoculations it is necessary, by the way of an introduction to this subject, to consider somewhat shortly the general principles of the defensive mechanism of the body to a natural or an artificial bacterial infection. When the body becomes invaded by a pathogenic organism, there is at once set into operation the complicated machinery of defensive processes, which have, as their aim, the production of protective substances which may or may not be successful in their action. And it has been conclusively proved that before a bacterial intoxication can take place the poison, or poisons, produced by the invading organism must enter into chemical combination with some cellular elements in the body, the cells affected varying in different infections. Wright has introduced the convenient term "tropines" for bacterial substances which have this chemical affinity for the cellular elements of the body, and the protective substances which are elaborated by the cells of the infected individual in response to the action of the tropines may be described as antitropines. The protective substances exist normally in varying quantity in the blood and body fluids of healthy individuals, but their source and mode of origin is still a matter of conjecture. The quantity of these protective substances, however, becomes increased whenever an infection naturally occurs or a vaccine is inoculated into the body, and by means of the technical methods of Wright, which will be described later, we have a method at our disposal of accurately estimating the antitropic content of the patient's serum. The recognition and application of the fundamental fact that an infection may be cured by the inoculation of substances—vaccines—obtained from the infecting organism is of paramount importance from the therapeutic point of view. Wright defines a vaccine as "any chemical substance which when introduced

into the body causes there an elaboration of protective substances." Thus in the treatment of staphylococcic infections the vaccine inoculated is an emulsion of a culture of the infecting organism, which has been killed by heating to a temperature of 60° C. In the case of tuberculous infections the vaccine consists of Koch's new tuberculin.

Wright, by the aid of his accurate technical methods, has shown that the production of protective substances, which follows the inoculation of a vaccine, follows a definite course. This definite course he sums up as the "law of the ebb, flow and reflow, and subsequent maintained high tide of immunity." In the treatment of bacterial infections by the inoculation of vaccines, the recognition of the definite course which obtains during the production of the protective substances is of fundamental importance. During the period of the ebb or "negative" phase, which ensues when an organism invades the body or a vaccine is inoculated, there is a diminution of the quantity of protective substances in the circulating blood, due probably to a temporary dislocation of the mechanism of antitropic production. The inoculation of more vaccine during the "negative" phase may lead to disastrous results, and this is what commonly occurred by the use of Koch's old tuberculin in the treatment of various forms of tuberculosis. Nowadays, however, by the adoption of Wright's technical methods, the antitropic content of the serum can be accurately gauged, and the subsequent inoculation of vaccine made at the appropriate time.

Following the negative phase, the antitropic content of the serum rises until it reaches its maximum (the period of flow or positive phase); after a varying time the antitropic content diminishes (period of reflow) to a certain extent, but still maintains a higher level than prior to the introduction to the vaccine (maintained high tide of immunity). It is during the positive phase, or period of maintained high tide, that subsequent inoculations of vaccine must be made if danger is to be avoided. This leads us to the consideration of the nature of protective substances (antitropines).

We recognise different kinds of antitropines, *e.g.* antitoxins, lysins, precipitins, agglutinins, and opsonins, with which we are now chiefly concerned. The presence of antitoxins in the serum is well seen in the case of diphtheria and tetanus, but in other bacterial infections it is impossible in most cases to demonstrate the presence of antitoxins in the serum. In the case of experimental typhoid and cholera infections, it has been shown by Pfeiffer and others that the immune sera in these diseases contain substances capable of causing disintegration of the typhoid and cholera bacillus respectively. These substances are called

lysins. But lysins have not been proved to exist in other bacterial infections, although their existence has been assumed, in the absence of definite proof, by many bacteriologists.

Consequently the study of immunity against organisms like the staphylococcus, streptococcus, gonococcus, tubercle bacillus, etc., has led to considerable controversy regarding the nature of the protective substances in the different sera. Metchnikoff has firmly upheld the phagocytic theory, maintaining that the defence of the infected host is brought about by the digestive action of phagocytic cells upon the invading bacteria. Other bacteriologists, however, have regarded the phenomena of phagocytosis as being of quite subordinate importance, the phagocytes only taking up and digesting the bacteria after their vitality has been injured by the presence of certain substances in the blood and body fluids.

Wright and Douglas have conclusively proved, by a series of ingenious experiments, that certain substances exist in the body fluids, which have the capacity of altering the vitality of bacteria, whereby they are rendered an easy prey to the phagocytic cells of the body. These substances they call opsonins (Latin *opsono* —I prepare pabulum for), and their researches go far to prove that in the phenomena of phagocytosis the factor of essential importance is the presence of these substances in the body fluids, whereas the phagocyte itself is largely an indifferent factor. The following may serve as an outline of the experiments of Wright and Douglas, on which these deductions are based.

Equal volumes of blood serum, washed leucocytes, and bacterial emulsion are mixed together and incubated at 37° C. for fifteen minutes. A film from the mixture is then made on a slide and stained, and the number of bacteria ingested by a number of leucocytes is counted. It is usual, for the sake of comparative observations, to count a certain constant number of leucocytes and strike an average. Wright and Douglas found that, if the serum were heated to 60° C. for fifteen minutes, the opsonic power of the serum was abolished, and they therefore regarded opsonins as being thermolabile substances, and quite different in nature from other substances — immune body, fixateur— found in normal and immune sera which resist the action of a temperature of 60° C. Other observers (Dean, Neufeld and Rimpau, Leishman), however, working with normal and immune sera derived from various sources, have found that these sera, after heating to a temperature of 60° C., still retained substances which promoted phagocytosis. Much controversy has therefore arisen as to whether these substances which prepare the bacteria for phagocytosis are thermolabile or thermostable. The question is of purely scientific interest. If the substances

called opsonins by Wright are completely destroyed by a temperature of 60° C., then we should be compelled to assume that they are new bodies hitherto unrecognised; but if it be proved that these substances which prepare the bacteria for phagocytosis are not destroyed by heating, then Wright has merely given a new name to a property of serum which has already been recognised by different workers. Dean finds that heating to 60° C. produces only a fractional destruction of the opsonin, which, in the case of normal serum, is present in such small amount as to be no longer measurable by Wright and Douglas's method. According to Dean, the fallacy in Wright and Douglas's method consists in the small quantity of serum examined, for this observer finds that the opsonin of normal and immune serum, when taken in sufficient quantity and subjected to a temperature of 60° C. for several hours, only shows a fractional deterioration. Dean, although accepting the term opsonin suggested by Wright as a convenient one to define "the sub stance which prepares the micro-organism for phagocytosis," does not regard it as a new substance, but merely as a property of immune serum already recognised. Most observers agree with Wright that the substances designated opsonins act by altering the bacteria and so rendering them an easy prey to phagocytes, although some observers look upon these substances as acting by stimulating the leucocytes to increased activity.

This latter view, supported among others by Leishman, has been largely disproved by the researches of Wright and Bulloch. Wright, in a recent paper, makes an important contribution to the much disputed question as to the effect of heating to a temperature of 60° C. upon the opsonins of normal and immune serum. He finds that only residual traces of opsonin remain after heating normal serum to a temperature of 60° C., and that the opsonin of immune serum, which contains a much larger quantity than normal serum, is destroyed by heating to the same temperature, if the serum be adequately diluted. Wright also points out the interesting fact that the salt content of the mixture of serum, leucocytes, and bacterial emulsion is an important factor in determining the degree of phagocytosis. The nature of the opsonin and its relation to other substances in immune serum may be still said to be *sub judice*, but the important fact remains that by the use of the technical methods devised by Wright and Douglas, we are enabled to gauge accurately the opsonic content of the patient's blood, and determine the appropriate times at which inoculations may be made during the course of the vaccine treatment.

Opsonins are found in the serum of healthy individuals, but their quantity can be greatly increased by the inoculation of

suitable vaccines during the course of immunisation. In the case of healthy individuals, Bulloch shows that the opsonic index, when tested by the tubercle bacillus, varies only within narrow limits. The opsonic index "is the result obtained by dividing the number of bacteria taken up per leucocyte in the presence of any given serum by the number taken up per leucocyte in the presence of the serum of a normal individual, which latter is regarded as unity." Thus the opsonic index of a patient the subject of tuberculosis is determined by the following ratio:—

$$\frac{\text{Patient's phagocytic count}}{\text{Normal phagocytic count}} = \frac{4}{7} = .57$$

In the treatment of bacterial infections by vaccine inoculations, the vaccine employed in most cases is a culture of the infecting virus, of which an emulsion is made in salt solution and then sterilised by a temperature of 65°-70° C. In the treatment of tuberculosis the vaccine used is Koch's new tuberculin, which consists of mechanically comminuted tubercle bacilli suspended in an indifferent fluid. It is very important that the vaccine should be carefully standardised. In the case of organisms like the staphylococcus, streptococcus, bacillus coli communis, pneumococcus, the dose is expressed by the actual number of organisms to be inoculated, and Wright has devised a simple method of estimating the number of bacteria in a definite quantity of bacterial emulsion. A definite volume of normal blood is mixed with a definite volume of bacterial emulsion. A film of the mixture is made on a slide and stained with Leishman's stain. The proportion of bacteria to red blood corpuscles is determined by counting several fields, and then the number of bacteria is estimated from the fact that 1 c.c. of blood contains 5000 millions of red blood corpuscles. In the case of staphylococcic infections, the dose varies between 500 and 2500 million bacteria for each inoculation. In the case of tubercle vaccine the dose varies from $\frac{1}{1000}$ mgrm. to $\frac{1}{100}$ mgrm. of tubercle powder, the bottles in which Koch's new tuberculin is sold containing 10 mgrm. of solid substance to 1 c.c.

The inoculation of a vaccine into the body is followed, as already described, by the production of protective substances, the formation of which follows a very definite course. During the course of vaccine inoculation it is of vital importance to make frequent estimations of the opsonic content of the serum, for, if a large dose of vaccine be used, the negative phase may be accentuated and prolonged, and the inoculation of a second dose during this period may be followed by disastrous results.

In the inoculation of subsequent doses the proper time must be determined during the positive phase or period of maintained high tide of immunity. Although the quantity of opsonin in the serum is raised above the normal level by vaccine inoculations, still the opsonic content is not capable of enormous increase. The phase of the maintained high tide is not maintained indefinitely, and the opsonic content may fall within a short time to normal or even below this. Wright has failed in the case of tuberculous infections to obtain a cumulation of positive phases, and he treats each subsequent inoculation as an independent event.

Therapeutic application of vaccine inoculations. — Cases of staphylococcic infection were those first treated by Wright by the method of vaccine inoculation. In his twenty published cases are included cases of furunculosis, sycosis, and acne, which had long resisted other therapeutic measures, but which, under the influence of the vaccine method of treatment, underwent rapid improvement, resulting in most cases in complete cure, although some cases showed a tendency to relapse. Bulloch has treated eleven cases of staphylococcic infection by vaccine inoculation, viz. five cases of facial acne, four of furunculosis, and two of sycosis. These were all intractable cases, and the most rigorous trial of other methods of treatment had failed to effect a cure or even any marked improvement. Of the eleven cases, nine were completely cured or immensely improved by vaccine inoculations. One case of furunculosis and one case of sycosis, both of long duration and unusual severity, were greatly improved under treatment, but have shown a marked tendency to relapse.

This method of vaccine inoculation brings into prominence the curious fact that whereas an individual may suffer for months from a staphylococcic furunculosis, a cure may be effected by the inoculation of small doses of the microbe which is the cause of the infection. The extreme chronicity of the process shows that there must be a very limited absorption of vaccinating material from the localised lesions, with the consequent imperfect production of opsonins. The stimulus for the abundant production of protective substances is in these cases to a large extent in abeyance. By the inoculation of vaccines, however, we have at our command a means of increasing the opsonic content of the blood, and thus one of great therapeutic value.

Although vaccine inoculations may lead to an increase in the opsonic content of the blood, yet the individual may remain for years the subject of a chronic infection. This is seen in cases of lupus and pulmonary tuberculosis. To effect a cure in these cases, it is necessary that the infected parts should be bathed

with blood rich in antitropic substances, for parts, the seat of a localised infection, are practically outside the body, and the infection may thus persist, even though the general opsonic content of the blood is increased. So that as a necessary adjunct in many cases to vaccine inoculations we must adopt measures, mechanical or otherwise, which will ensure the infected part being freely bathed with lymph. This is the rational explanation of the success which has attended the adoption of Bier's congestive method of treatment of localised infections, *e.g.* whitlows, tuberculous joints, etc.

Tuberculous Infections.—Vaccine inoculation in the treatment of various forms of tuberculosis has already yielded most excellent and encouraging results. Wright and Bulloch have published numerous cases which demonstrate the efficacy of this treatment, and the results already obtained give a promising outlook for the cure of certain localised forms of tuberculosis, which have hitherto proved most intractable in the hands of the physician or surgeon. Many cases of lupus (one of twenty years' standing), tuberculous glands, abdominal tuberculosis, genito-urinary tuberculosis, and localised tuberculous infections have been immensely improved or cured, and the results have been the more significant as most of these cases were the incurable residuum of hospital practice. The results obtained in systemic tuberculous infections have not been so satisfactory.

The vaccine employed was Koch's new tuberculin, and the marked curative properties it possesses, when the inoculations are carried out on the principles laid down by Wright, have been strikingly demonstrated by the excellent results obtained. Minute doses suffice to effect a cure, but the treatment must be prolonged, the fluctuations of the opsonic content of the blood being carefully gauged so as to make the subsequent inoculations at the most appropriate time. .

Vaccine inoculations have also yielded good results in the treatment of other bacterial infections, *e.g.* infections due to the bacillus coli communis and the pneumococcus.

From the results hitherto obtained in the treatment of bacterial infections by vaccine inoculations, there is every reason to look hopefully in the future to the wide applicability of this potent therapeutic measure in the treatment of all forms of localised bacterial infections, and it may be also of more generalised infections.

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OPHTHALMOLOGY

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Sympathetic Ophthalmia ("Bacteriological examination of the blood in cases of sympathetic ophthalmia and other forms of irido-choroiditis," by Dr zur Nedden, Bonn, *v. Graefes Archiv*, lxii. 2).—zur Nedden takes it for granted that sympathetic ophthalmia is due to a microbic infection. Observers are agreed that the infective agent cannot be one of the pus-forming organisms; further, that it must be very resistant and capable of remaining alive in the tissues for long periods; and, lastly, that it does not appear to produce any toxine which has a deleterious effect on the general health of the individual affected by the disease. No organism with characteristics conforming to those just mentioned has yet been identified. The organism

apparently cannot be successfully grown on any known medium. Schirmer, by transplanting small pieces of tissue from affected eyes into the anterior chamber, has succeeded in causing a chronic progressive uveitis in rabbits' eyes. He claims that this proves the bacterial origin of sympathetic ophthalmia; but the objection may be brought forward that the inflammatory process in these cases was caused by some other agent accidentally present in the particle of transplanted tissue. In many eyes which cause a sympathetic ophthalmia, as is well known, there is present an ordinary wound infection, more or less severe, as well as infection with an agent capable of producing the disease. zur Nedden had the opportunity of investigating fully three cases. His methods consisted in implanting small pieces of tissue from the exciting eye into the anterior chamber and the vitreous of rabbits. He also inoculated the eyes of rabbits with blood drawn from patients suffering from the disease. The period at which one would expect to find the infective agent in the blood would be about the time when the second eye is attacked. At a later period the organisms are more likely to have been destroyed by the action of anti-bodies. In all probability the human body becomes immunised against the infective agent very slowly, but that it does become immune is shown by the fact that the disease sooner or later comes to a standstill. zur Nedden considers that sympathetic ophthalmia does not break out till the organism has multiplied in the blood. The simultaneous appearance of inflammatory foci all over the eye points to an invasion by organisms in large numbers. The occurrence of fresh waves of inflammation from time to time in the course of the disease may be due to re-infection from the blood stream.

CASE I. Youth of 19 years, perforating wound of scleral margin from a piece of metal on 25th June 1903. The iris and ciliary body were slightly caught in the wound. On 20th July V.=$\frac{1}{2}$. On 26th August the scar with adherent and prolapsed uveal tissue was found projecting and was excised. No undue signs of reaction followed, but on 8th September slight keratitis punctata was noted in both eyes. Inflammatory signs increased steadily, and on 12th November V. in injured eye had fallen to $\frac{1}{20}$, and in the second eye to $\frac{2}{7}$ of normal. The injured eye was removed, but this had no influence on the course of the disease in the second eye, which, in spite of energetic treatment, became blind.

zur Nedden thinks that in such a case as this the simultaneous appearance of a similar inflammatory process in the two eyes is best explained on the theory of a metastatic infection.

In this case implantation of fragments of tissue from the

enucleated eye into the anterior chamber and vitreous of rabbits' eyes gave only negative results. Pieces of optic nerve, retina, ciliary body, iris, and vitreous were used. Cultivation experiments on artificial media also gave uniformly negative results. Inoculation experiments with blood drawn from the patient proved more successful. Blood drawn by the artificial leech (amounting to 20 or 30 c.cm.) was poured into a glass cylinder and allowed to stand half an hour in order that germs, if any were present, might sink. From the bottom of the glass a small quantity was withdrawn with a syringe, and as much as possible injected into the vitreous chamber of a rabbit. By previously evacuating the aqueous, it was found possible to inject .3 to .4 c.cm. of blood. From the same syringeful of blood, cultures were made in all sorts of media to determine whether the blood had been contaminated. These cultures all proved sterile. The first inoculation was made from the patient's blood eight days after the outbreak of sympathetic ophthalmia.

For five days after inoculation no striking change was observed, but about the eighth day a haziness of the vitreous became evident, accompanied by diminished tension. Four days later a yellowish exudate was visible in the vitreous. Some of this was removed with a Pravaz syringe, but attempts to obtain cultures failed absolutely. On the other hand, inoculation of some of the exudate into the eye of another rabbit caused the same form of slow inflammation with exudation into the vitreous. After five weeks it was found impossible to obtain any result by inoculating from the exudate. Intravenous injection of 0.2 c.cm. of the exudate dissolved in physiological salt solution had no apparent effect on the eyes of the rabbits used.

In order to gain further information, modifications of these experiments were made as follows:—

1. Immediately after withdrawing the blood, part of it was injected into the vitreous of a rabbit.
2. Part of the blood was put through a Berkefeld filter and the clear filtrate used for injection.
3. Another portion of the blood was exposed for three-quarters of an hour to a temperature of 50° to 60° C. and then injected.

Blood was drawn seven times with the Heurteloup, and three times direct from a vein of the arm. The blood drawn by the Heurteloup gave only one positive result, viz. on 19th November, or six weeks after the outbreak of sympathetic ophthalmia and when the inflammatory process was extremely severe. The positive result was obtained with blood which had been heated as described. On the fifth day after injection,

symptoms of irritation appeared, and by the seventh day marked ciliary injection, severe iritis, and a yellowish exudate in the vitreous were noted. Some of this exudate was withdrawn and part of it injected into the vitreous of another rabbit. Another portion was mixed with NaCl solution and passed through a filter, while a third part was heated to 60° C. for three-quarters of an hour. Injection of the filtrate gave a negative result, but in the other two cases severe inflammatory symptoms followed the injection. Cultivation experiments proved again quite negative, and no bacteria of any sort could be found in the exudate with the microscope.

In one of the three inoculations made with blood drawn direct from a vein a positive result was obtained, viz. irritation of the eye with slight yellowish exudate in the vitreous. The process, however, seemed to come soon to a standstill, and attempts to convey the inflammation to the eye of another rabbit failed.

From these experiments zur Nedden concludes that the blood of the patient suffering from sympathetic ophthalmia contained organisms capable of causing inflammation when introduced into the rabbit's vitreous. This organism cannot pass the Berkefeld filter, and since the filtrate is innocuous no toxine appears to be secreted. Further, the organism must be very resistant to heat.

CASE II. Girl, 12 years, on 17th November 1903 sustained large wound of left eye at corneo-scleral junction involving iris and ciliary body. The wound healed but the eye remained irritable. Parents refused to allow enucleation. A month after the primary injury the right eye showed keratitis punctata and ciliary injection. The injured eye was removed on 21st December, but the condition of the second eye grew steadily worse. About twelve weeks after the beginning of the sympathetic ophthalmia zur Nedden injected subcutaneously 20 c.cm. serum which he had taken from his first patient. The inflammation had by this time run its course, and apart from loss of sight the patient was in good health. On the second day after the injection of the serum the severe inflammatory symptoms in the girl's eye began rapidly to abate. The keratitis punctata disappeared and the pupil dilated under the use of atropin. This improvement lasted for three weeks, when there was a slight recurrence of inflammation, which, however, soon passed off. On 1st May 1904 the eye was free from irritation with V. = $\frac{2}{3}$, and this fortunate state of affairs has been maintained.

zur Nedden thinks that the result was due to the antibodies contained in the injected serum. Pieces of tissue from the exciting eye gave in this case also completely negative

results except in one instance, where implantation of a fragment of choroid was followed by an inflammation lasting about three weeks. Ten injections of blood drawn by the artificial leech were made into the vitreous of rabbits. In one case a slow irido-cyclitis, with extensive yellow exudate, resulted. The blood which gave this result had been heated for three-quarters of an hour to 58° C. Cultivations from the blood were negative, nor could any trace of organisms be found in the exudate in the rabbit's eye, yet the inflammation was readily transferred by inoculation into the eye of a second rabbit. Heating the exudate mixed with salt solution to 60° C. for three-quarters of an hour did not deprive it of the power of causing inflammation in another eye, but a filtrate of the exudate proved quite harmless. These results, it will be observed, correspond in all essentials to what was observed in Case I.

In the plastic exudation from the vitreous of a rabbit (fourth inoculation), after staining for twenty minutes in alcoholic fuchsin, very small, delicate bacilli were observed with the microscope. Culture experiments failed, however, until finally a large quantity of the exudate was taken and mixed with blood serum from the rabbit. (Later zur Nedden succeeded in growing the organism on ascites agar, bouillon, and Loeffler's serum.) The bacilli resemble the Koch-Weeks' organism in form. Staining was best in fuchsin or Gram. In ascites bouillon the bacilli produced acids, but apparently no toxin. They were very resistant to heat. zur Nedden would include the organism in the pseudo-diphtheritic group. Intraperitoneal injections of 1 to 3 c.cm. of pure culture in rabbits and guinea-pigs caused no sign of illness in the animals. Very large injections caused encapsuled abscesses, which tended to heal. Injections of small quantities into the vitreous of rabbits caused the same slow plastic exudation as had been noted after the blood injections. The inflammation led after some weeks to atrophy of the globe. For three weeks at least the bacilli could be cultivated from the vitreous exudation. No change in the other eye was ever noted.

In twenty-five rabbits injections of pure culture (1 to 10 c.cm.) were made into the common carotid. In ten cases in the side of the injection a severe plastic iritis supervened, beginning on the second or third day. In most of the cases the inflammation settled down in three or four weeks. The bacilli could be cultivated from the aqueous.

Three of the ten animals with iritis remained healthy. The other seven died in six to eight weeks, in one case with meningitis and in another with abscess of the kidney. In the five remaining cases there were found nodules in the liver, due

to amœbæ, so often found in rabbits. Bacilli were found in the neighbourhood of these nodules.

Injection of 10 c.cm. of pure culture into the common carotid of two cats and three dogs gave a negative result. The injection of 15 c.cm. pure culture into the leg vein of a Rhesus monkey was also without result.

Injection into the meninges caused meningitis in only one rabbit out of five, and five guinea-pigs endured this experiment without symptoms.

zur Nedden would not, of course, draw definite conclusions regarding the relationship of this pseudo-diphtheritic organism to sympathetic ophthalmia. He claims, however, that it fulfils the conditions required from the organism which will be found to cause the disease. The slight pathogenicity for organs other than the eye is not, according to him, an obstacle to our recognising this bacillus as one capable of causing sympathetic ophthalmia. Leber, as is well known, considers that it has not been proved that the organism causing sympathetic ophthalmia is absolutely without influence on organs other than the eye.

The fact that sympathetic ophthalmia can follow perforating wounds of all sorts points to the organism being found in the normal conjunctival sac. zur Nedden thinks that in his first experiments he may have overlooked the presence of the same organism which he successfully obtained in his second case. He is not sure that only one form of organism is capable of producing the disease.

Case III. may be shortly quoted. Woman, 35 years, developed sympathetic ophthalmia six weeks after an injury. The injured eye was removed, but the inflammation in the second eye led to blindness in spite of treatment. A series of experiments made as in the previous cases gave completely negative results.

This patient was pregnant seven months at the time of the outbreak of sympathetic ophthalmia. The eyes of the child were quite normal, so that the cause of the disease must have been arrested in the placenta.

zur Nedden made some additional experiments in cases of other forms of uveal inflammation. Among these we may quote the following. In six cases of irido-choroiditis serosa plastica, inoculation of blood drawn from the patients into the vitreous of rabbits gave negative results. Fragments of iris tissue, removed by iridectomy, when implanted caused no reaction. Injection of aqueous from a case of iritis serosa was also without result.

In a case of severe double iritis, described as metastatic, a few colonies of staphylococcus albus were cultivated from the blood. These cocci were of low virulence, but injection of a pure culture into the vitreous of a rabbit caused a severe inflammation.

DERMATOLOGY

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X-RAY TREATMENT OF RINGWORM

WHEN a marked case of ringworm affects a child's head the physician is face to face with a condition which, in spite of assiduous attention, may take years to remove; on the other hand, the same disease affecting the glabrous skin yields often to the application of even the mildest domestic remedies.

Sabouraud's record of successes were at once hailed with joy, especially as the treatment by converting the skin of the scalp into the condition of the general body surface seemed eminently rational.

Aldersmith (1) points out that in 1893 he stated that the cure of ringworm rested on a means of producing temporary alopecia. He uses a saturated solution of boric acid in spirit and ether, which is kept applied constantly by soaks. Recently he narrated a case where, in eleven weeks, cure followed this treatment when applied to a microsporon affection.

Depilatory powders, such as—

Barium sulphide
Zinci oxidi
Pulveris amyli—ana partes æquales

have been used similarly, and are still used in certain cases in the skin clinique in the Edinburgh Royal Infirmary.

These and other methods, however, do not attack the disease at the roots of the hair, and as X-rays produced complete epilation the outlook seemed more hopeful.

The claim of priority might well be made for Edinburgh Skin Department, as it has been made for many other individuals and institutions, but to Sabouraud (2) must fall the credit of putting X-ray treatment of ringworm on a scientific basis, or at least taking the first steps towards scientific accuracy.

His technique is as follows:—

Using a static machine as the source of electricity, he encloses a Chabaud X-ray tube in a metal case with an opening towards the patient's head. Into this opening cylinders of varying diameter (to suit different areas of disease) are fitted, and their length is such that the patient's head is 15 cm. from the anode. The spark gap is less than 10 cm., and at a distance of 7.5 cm. is fixed a pastille of barium platino-cyanide, which will have assumed a definite tint when the requisite dose has been

given, *i.e.* it changes from a greenish yellow to a fawn colour. On the seventh day slight erythema appears, and two weeks later all the hair has fallen out. From the day of the operation, while waiting for depilation, an oil of cade ointment is applied to the whole head every evening—

Oil of cade, 10 grammes
Lanoline, 25 grammes

and is washed off with soap every morning. After the morning washing the whole head is treated with—

Tincture of iodine, 10 grammes
Alcohol, 60 per cent., 90 grammes

This is to prevent the hairs, when they fall out, infecting healthy and untreated regions, as the X-rays do not kill the fungus.

It takes other two months till the hair grows in again, and "whereas ringworm was formerly cured in two years, it is now cured in three months or freed from infection in one month"; and, to continue the translation, "an average cure costs 260 francs, and formerly cost 2000 francs." Unfortunately results in this country do not follow with such mathematical precision, and from all sides reports of failures have been recorded and new methods of measurement and modes of procedure have been suggested.

Sichel (3) roughly estimates his successes at 50 per cent., and in only 1 per cent. did a dermatitis and permanent baldness ensue.

Oram (4), out of 108 cases, records 47 cures and 11 failures, 15 are still under treatment, and the rest have been lost sight of.

Batten (5) in 25 cases has had 1 case of mild dermatitis and 3 failures.

In dealing with hospital cases, as the last-mentioned writer observes, insufficient attention to cleanliness is a frequent source of failure, private patients being more successfully dealt with.

The protection of the rest of the head is an important matter, and is attained in Sabouraud's method by the metal cylinder. Others use cylinders of leaded glass, but most use lead foil with holes cut opposite the affected areas. Batten used a boy's cap coated with white lead.

Before treatment, all the hair should be closely clipped, as many unsuspected spots are then frequently found.

If the whole head has to be denuded, four or five exposures have to be given from various directions, avoiding overlapping of the dose if possible. Smaller areas are best marked out by iodine or a blue pencil. Some workers still use repeated exposures of ten minutes' duration, as they consider it safer; but many patients, especially coming from a distance, will object to

this, more especially if they hear of only one exposure being successful in other cases. In spite of this, however, if one long exposure fails, it is safer to start again by using several shorter exposures.

Walsh (6), with a view to prevent infection in schools, has recommended the following as a routine practice :—

"The scalp is first shaved, then rubbed with turpentine and washed with soap and water and dressed thoroughly with a germicide, such as a weak solution of formalin or sulphurous acid. It is then exposed to the X-ray tube for ten minutes, and finally painted with several coats of a 10 per cent. solution of salicylic acid in flexile collodion." This cap is strengthened if necessary by gelatine or rubber, and after a week or ten days it can be pulled off, and the process is repeated twice or thrice. He claims that the advantages of the combined cap-film method of treating ringworm are the following :—

1. Infection of other children is prevented by isolation of the individual scalp.

2. Cure is hastened by the depilation alike of diseased and of healthy hairs.

3. The depilation of diseased stumps is effected by an extremely slow but powerful traction upon a bulb loosened by the application of the X-rays, or by some mild local irritant remedy.

4. The method differs from all hitherto devised, inasmuch as it combines direct and indirect curative measures with local isolation.

5. The X-rays, if wished, can be applied through the cap-film.

6. The children affected with ringworm can attend school if their scalps be thus locally isolated.

7. Treatment need not be applied oftener than once every week or ten days.

8. In large towns, affected children could be brought to a central station for treatment by an expert.

Where one treats by means of one exposure, as Sabouraud suggested, one may summarise the possible causes of failure under two groups—

A. Imperfections in the method of application.

B. Variations in the patient and the type of the disease.

Under group *A* the following particulars have to be considered :—

1. The source of energy varies with different observers—a different voltage and amperage being used.

2. Coils and static machines vary in their output, even when using a similar voltage and amperage.

3. Alterations in the rapidity of interruption cause alterations in the output.

4. Authorities differ as regards the requisite hardness of tube.

5. The X-ray production from a tube varies from minute to minute and day to day.

6. The milliamperage going through a tube is not an absolute test.

7. Sabouraud's pastilles are mostly considered unreliable, although Adamson (7) considers them perfectly accurate. Other writers mentioned in this résumé all take the other view.

Under group *B* may be classed the following:—

1. There is an idiosyncrasy on the part of certain patients.

2. In the case of a child there is a difficulty in keeping the head absolutely steady.

3. Granting even that the hairs are loosened, many lie loose in the follicles in certain cases and do not come out.

When one considers all these factors that make for failure, is it small wonder that uniform results have not been obtained? How to rectify this must be our object, and faults due to group *A* can probably be minimised by careful observation.

It is imperative that the apparatus should be under the careful—at least periodic—supervision of the physician, who with long experience can often get nearer the true dose by a look than can the tyro with all the measurements available to him. Schiff, we understand, relies on this plan chiefly. Every apparatus has, if one might use the phrase here, a personal equation which it is very desirable to ascertain, the hardness of the tube, milliamperage passing through, and fluorescence being here doubly valuable as tests.

Macleod (8) has recommended the use of a speed-counter for the interruption, and as an adjunct it may be useful. He uses a tube giving 3 to 4 degs. of penetration on the radiometer, a spark-gap of about 10 cm., and a current of $\frac{3}{4}$ of a milliampere, and gives about 16,000 interruptions of the primary circuit. Other observers measure by the time, somewhere about 20 minutes, and it is as well to control with Sabouraud's pastilles. In all cases the tube must be watched during the exposure and softened if it gets too hard. The Chabaud or the Hirschmann regulating tubes are very useful for this purpose.

Group *B* will, we fear, prove a permanent source of trouble. It is true that many deny the idiosyncrasy of the patient, but one sees it frequently in X-ray treatment of other conditions; and, after all, one might rationally expect it, seeing it is universally recognised that different skins react differently to various irritants.

To secure the removal of loose hairs lying embedded in their follicles, a nail-brush and general massage is helpful, but as often there is no projecting stump, it is at times ineffectual. Luckily, it is not a condition invariably present, and where absent the prognosis is more hopeful.

By the loosening of diseased hairs, the risk of spreading the affection is increased, and, as has been mentioned, punctilious washing and rubbing in of antiseptic ointments is an essential.

Ordinary soap and water does very well, but if preferred, soap-spirit may be used. Batten uses a 1 per cent. resorcin lotion. As regards ointments—

Sulphur præcipitate
Hydrarg. ammoniati ℥ss
Vaseline ad. ʒi, or
10 per cent. oleate of copper, or
2½ per cent. salicylic vaseline with ammoniated mercury, ʒi to the ʒi of vaseline

may be mentioned.

Dore (9) rightly states that a pustular eczema and even seborrhœa may be left behind which simulates the original disease, but in every case a careful microscopic search should be carried out.

We may seem to have been too pessimistic in this résumé, but when the worst is said there still remains the fact that the treatment is much more expeditious than any we have yet used. Further, the risk of a permanent alopecia is slight, and if the treatment otherwise is a failure, no harm results, as the usual methods are being followed at the same time.

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New Books and New Editions

Statistical Tables of Patients under Treatment in St Bartholomew's Hospital during 1904. London: Charles Skipper & East. 1905.

THESE tables give a complete and thorough report of the work of the hospital. A list of male and female patients tabulated according to their occupation is instructive in showing what classes of patients most frequently avail themselves of hospital treatment. The arrangement of the general tables of medical and surgical diseases remains much as formerly, but in the case of the special departments the diseases of the female generative organs are included in the medical report, while the operations for these diseases are entered in the surgical tables, a division which is not in accordance with modern views of gynecology.

The surgical report consists of two tables, one showing the total number of cases under treatment, and the other the number of operations performed. The relatively high proportion of operations to cases treated may be explained by the comparatively small number of patients admitted for injuries.

Fourteen different kinds of anæsthetics, or mixtures of anæsthetics, were administered in the hospital, pure chloroform heading the list in 2694 cases, while ether was given pure on only 14 occasions.

One death only occurred out of nearly 8000 administrations.

An appendix of 25 pages is devoted to a detailed history of the more interesting cases, while an instructive table on appendicitis, dealing with the cases of the last ten years, shows the increased number of cases treated, and the diminishing mortality of operative treatment.

The report is one of the best issued by a large hospital, and might well be taken as a pattern by other hospitals.

An Atlas of Illustrations of Clinical Medicine, Surgery, and Pathology: compiled for the New Sydenham Society. Fasciculus XXIV., being XVIII. and XIX. of the Clinical Atlas. London: The New Sydenham Society. 1906. Price to non-subscribers, one guinea.

THERE are seven plates showing examples of elephantiasis in English practice, seven cases of the affection in the lower extremity and four where the scrotum is the seat of the disease; the last two are associated with old suppurative conditions of the inguinal glands.

There is a plate showing lupus vulgaris on both cheeks in a woman of forty-nine. Dr Unna, of Hamburg, has lent two photographs of morphœa herpetiformis, which have been most beautifully produced.

The other plates are of vaccination sore on the cheek, due to the accidental inoculation of an acne pustule; cross-union of the bones of the forearm after fracture; rodent ulcer on both sides of the face. "Potato-like" tumour of the neck is depicted in three plates, with micro-photographs of the condition. There is an excellent plate of cicatricial keloid which followed a burn from sulphuric acid.

Lastly, two plates illustrative of the schistosoma Cattoi, a new blood-fluke of man, with descriptions by Dr Catto, help to complete an interesting number.

Essentials of Bacteriology: Being a Concise and Systematic Introduction to the Study of Micro-Organisms. By M. V. BALL, M.D. Fifth edition, thoroughly revised by KARL M. VOGEL, M.D. Pp. 243. London: Henry Kimpton. 1906. Price 4s. net.

THE issue of the fifth edition of this introduction to bacteriology has furnished opportunity for the inclusion of recent advances in technique and in the bacteriology of special diseases. The volume will prove useful to the student, but might be much improved by careful revision, so as to eliminate discrepancies, to perfect certain processes, and to repair omissions. For example on p. 72 it is stated that the dog is immune to tubercle, but on p. 105 the dog is included in a list of animals subject to tubercle. Again, on p. 42 the diphtheria bacillus is correctly stated as staining by Gram's method, but on p. 112 it is said not to be coloured by this method. In the examination of air by Petri's method, the aspiration of one hundred litres in fifteen minutes is recommended, but practically if this rate be adopted the filtration is not perfect and a much longer time is required to filter properly so large a quantity. One notable omission is the absence of any mention of the bacillus enteritidis sporogenes, an organism of great importance in the examination of sewage-polluted waters. The book is furnished with numerous illustrations of apparatus and of micro-organisms, and these, together with the tabular descriptions of bacteria, add largely to its value to the student.

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SOME RECENT OBSERVATIONS ON CANCER AND TUMOUR GROWTH

An Address delivered in the Section of Pathology, Australasian Medical Congress, Adelaide, September 1905

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Professor of Pathology in the University of Sydney
and President of the Section

Introductory.

OF all the great scourges of mankind, only one remains untempered by that scientific study of disease which we term pathology. Smallpox, except in isolated outbreaks, is a thing of the past. The pyæmia that was wont to render perilous every surgical operation has yielded to antiseptic and aseptic measures. Diphtheria and hydrophobia have been robbed of half their terrors. Bubonic plague, despite the colossal failure of India, may be successfully combated in an intelligent community. Outbreaks of enteric fever and of cholera are in every sense of the word preventible. The prevalence of malaria, with its long tale of disablement and death, is conditioned by the facilities provided for the breeding of mosquitoes. And that tuberculosis should continue to be of all diseases the most wasteful of human life is a fact that is not creditable to us as a profession nor to us as a people, for it is due wholly to the disregard of what pathology with no uncertain voice has taught. But cancer and tumour growth are as rife to-day as ever. If there be any change, it is probably not in the direction of abatement, and, even if there be abatement, pathology has contributed nothing to it. No means of prevention is known, nor

certain means of cure. The only relief—that afforded by careful, free, and prompt excision—is at the best uncertain.

No problem in pathology, therefore, is more urgent, no problem is more elusive, than that of the nature and origin of tumour growth, and within recent years there have been awakened interest and renewed activity in its investigation. Under the gracious patronage of His Majesty the King, the Imperial Cancer Research Fund has been inaugurated on a scale unprecedented in the history of Medicine, while the able workers who are more directly responsible for its scientific application have made excellent use of their unique opportunity. Elsewhere in Europe and in America many similar institutions have been started, and, under their auspices, as well as independently, much good work is being done. The result is that, since the last meeting of this Congress, when papers on cancer of great interest and value were read by Professor Allen and other members, there have been published observations and hypotheses of a most noteworthy and suggestive character. That as yet their full significance is uncertain and their practical bearing unknown does not detract from their present interest as illuminating conceptions, nor from their permanent value as stages in the attainment of scientific truth. It is with the object of inviting your attention to some of this recent work that I have framed my address, although the time at my disposal will necessitate a very fragmentary review.

It is unnecessary to introduce subtleties of definition, or to discuss the relation of tumour growth to those conditions known as inflammatory. I have throughout used the words tumour, new growth, and neoplasm as interchangeable, and the word cancer as connoting all the more malignant forms irrespective of structure. I have occasionally used a general term instead of the more restricted term cancer or malignant growth, because, in my judgment, any explanation of the nature and origin of the most malignant forms (cancer and sarcoma) must be ultimately applicable to the least malignant (benign) forms also. The varying degrees of malignancy, and the various factors that condition malignancy, are mainly dependent upon attributes that are common to all neoplasms, though not always present in the same degree. The distinction between a malignant and a benign tumour, all-important in clinical practice, depends not

on any essential difference in kind, since all neoplasms alike are independent of the needs of the parent organism, and independent of the laws that regulate the growth of the parent tissue, and exhibit, moreover, a certain mutual independence and intrinsic vitality in their constituent cells; the distinction depends rather on the degree to which are developed those fundamental attributes, and also on such accidental conditions as the ease with which the individual cells may be mechanically detached from the tumour mass, and their powers of penetrating and infiltrating adjacent tissues.

Artificial Production and Transplantation of New (Growths Neoplasms).

Half a century ago the scientific genius of Virchow laid the foundation of modern experimental pathology in two general biological principles: (1) that every cell in the body is descended from a pre-existing cell, and (2) that the reactions of the living cells of human tissues are essentially similar to the reactions of other animal cells, so that it is legitimate to argue from what occurs in animals to what occurs in man. Both of these principles become of fundamental importance in relation to cancer research, since it became known that animals do suffer from new growths of which the structural details are often identical with those of tumours occurring in man. In view of these principles and facts, it has long been recognised that the artificial production and transplantation of tumours in animals was essential to the proper study of neoplasia or tumour growth.

To this end innumerable experiments have been made, and when investigation flagged under the deterrent influence of consistently negative results, a fresh stimulus was given by the development of bacteriology. The resemblance between the invasion of a cancer and other infective processes which had been compelled to yield the secret of their origin, fostered the expectation that the cause of cancer also would be found in some form of microbe. Many different parasites were described within cancer cells, several were obtained in pure culture, and a few, inoculated into animals, gave rise to cell-proliferations somewhat resembling tumour growth. But such resemblances

were only superficial and misleading. Notwithstanding the great amount and the occasionally brilliant character of such work, it must be conceded that no one has yet been able to originate an unequivocal new growth by the agency of any parasite.

When healthy tissue is transferred from one animal to another, the graft may "take" or may fail to "take." The probability of success is greater when the graft is made into another animal of the same species. Such an artificial graft may form a hypertrophic overgrowth when transplanted from a less vascular to a more vascular site, but it never acquires the independent and unregulated growth characteristic of a tumour in the sense in which we are using the word. The oft quoted experiment of Lambert Lack, who in 1900 disseminated the cells of the ovaries of a rabbit throughout its peritoneal sac, and more than a year afterwards found an extensive cancerous infiltration of the abdominal and thoracic viscera, is open to other interpretations. This particular experiment, moreover, has been many times repeated with invariably negative results. In July 1903 I instituted a series of transplantations of epithelial cells from the chorion, ovary, thyroid, adrenal, and epidermis in such animals as guinea-pigs, rabbits, cats, and dasyures, the transplantations being made into other parts of the same animal, into other animals of the same species (of the same and of opposite sex, and at different ages), and into animals of different species, but, with one doubtful exception, I succeeded only in adding another to the long list of failures to produce tumour growth by this means. The exceptional case was that of a guinea-pig into whose peritoneal sac chorionic epithelium from another guinea-pig had been introduced and which later died, having in its pelvis a large mass of recently extravasated blood in which proliferating chorionic epithelium was found.

When introduced into animals of different species the transferred cells are usually, though not invariably, destroyed by cytolysins, the living tissues reacting towards them as towards other alien albuminous molecules. Occasionally, however, the alien cells are tolerated and may even be adopted as integral portions of the new organism. Blood corpuscles, for example, do not invariably undergo hæmolysis when transfused into animals of different species, and grafts of epidermis from the

rabbit and the puppy may thrive on denuded surfaces in man. It is important to recognise these facts, since they indicate no reason why cancers should not occasionally also be transmissible to alien species. It is known that epitheliomata tend to arise in the cicatricial tissue of old burns and in other scars, and it would be interesting to ascertain whether the liability is greater when no grafts have been made or when grafts have been taken from another person of earlier or later age, or from animals whose term of life is shorter than that of man—whether, in fact, the presence of an epithelium of a different tenure of life has any relation to the incidence of the epithelioma.

The secondary dissemination (metastasis) of certain malignant new growths may be regarded as a process of natural transplantation, and illustrates the possibility of transferring such tumours to other parts of the same individual. That this may be accidentally effected in the excision of a malignant growth has been repeatedly emphasised. If a cancer be incised during removal, cancer cells may escape from the cut surfaces, or be carried by the knife into adjacent tissues, and, becoming there implanted, give rise to a local recrudescence. Moreover, a growth of restricted malignancy may accidentally be given an opportunity of extensive infiltration, as when a cystic adenoma of the ovary is ruptured and the liberated epithelial cells infect the peritoneum.

Since, therefore, a natural or artificial dissemination of certain tumours is so readily effected in the individual in which they originally grow, it might be expected that such growths would bear transplantation at least to other similar individuals. Such an expectation is far from being realised. Human new growths have never to my knowledge been transmitted to other animals, notwithstanding many attempts, of which a most extensive series was undertaken by Shattock and Ballance in 1890. Nor am I aware of any authentic instance of the successful transference of a new growth to an animal of different species. Even when inoculations are made into animals of the same species, except in the case of certain infective granulomata which are not true neoplasms, the usual result is failure, and at the date of the last meeting of this Congress in February 1902, only a few isolated successes had

been recorded. Obviously such a record of failure has constituted a serious bar to the investigation of tumour growth.

The first to achieve systematic success in the transplantation of tumours was Jensen of Copenhagen, whose results were not made generally known until 1903. In the same year Borrel of Paris published another series, and in 1904 there appeared the First Scientific Report of the Imperial Cancer Research Fund, in which further examples were recorded. All these successes were obtained by transplanting tumours of mice to other mice. In no other animal, with the single exception of the rat, which is of the same genus as the mouse, has there been effected a successful transplantation of a neoplasm even from another individual of the same species. Attempts to transfer malignant new growths from the horse, dog, cat, rat, and carp to other animals of the same species have, at the hands of the Cancer Research Fund, resulted in failure, although in the case of the dog, cat, and rat over nine hundred inoculations were made. In December 1904 I made an endeavour to transfer a squamous epithelioma from a dasyure (*Dasyurus Viverrinus*) by inoculation into fifteen other dasyures and into ten cats, but nearly all the animals died within a week of a virulent septicæmia, and the few survivors show no sign of new growth to this day.

Earlier in the same year I had, through the kindness of Mr A. S. Le Soef of the Zoological Gardens, Sydney, obtained specimens of cancer from a lioness and from a tigress, both of which were old animals, and by a remarkable coincidence had died within a few days of each other. I have now under investigation a growth from a frog (*Hyla Aurea*) which I received a few weeks ago through the kindness of Dr Chapman, and with it I have been able to infect other frogs, but not yet to determine whether it is a true neoplasm or merely some form of infective granuloma. I have not yet been able to obtain a new growth in a mouse, but that is not surprising, since out of thirty thousand tame mice examined by the Cancer Research Fund, only twelve were found to have malignant new growths, and not all of them were transmissible.

Jensen's original tumour was an epithelioma growing in a white mouse. Introduced into other mice it yielded at first thirty to sixty per cent. of successful transplantations, and it has

proved to be one of the most readily transmissible of all tumours hitherto tested. It is still growing, like a pure culture of bacteria, in various laboratories on the continent of Europe, in England, and in America, the medium on which it thrives being successive generations of mice. In its duration of life (three and a half years) it has already exceeded the natural term of life of a mouse, and in bulk it has surpassed that of many thousands of mice. This great power and persistence of growth is paralleled only by the natural propagation of successive generations of mice, and indicates an enormous potential vitality in the cells of the new growth, a vitality comparable to that which secures the continuance of the race. Nor is this an isolated phenomenon. The production of tissue by transplantation of other cancers of mice may proceed no less rapidly.

Jensen made so careful and accurate a study of the conditions of successful transplantation, and of the nature of the process, that his results have been abundantly confirmed, notably by the Cancer Research Fund. He found that the cells of the new growth could be isolated from the body for a considerable time without losing the power of originating a fresh tumour. When kept in a sterile condition on ice, the cancer cells could still give rise to a new growth, even after eighteen days, whereas an exposure of less than forty-eight hours to the body temperature rendered all inoculations abortive. "The tumour received by the Cancer Research Fund from Professor Jensen was forwarded by post from Copenhagen under sterile precautions, and used for inoculation on the fifth day after it had left Copenhagen" (*First Scientific Report*). These facts illustrate from another point of view the remarkable vitality with which the cells of the new growth are endowed.

In their general characters such transplanted growths resemble very closely the secondary (metastatic) disseminations naturally occurring in the course of many malignant tumours. The constituent cells of each are the direct descendants of the cells of the primary growth. In the case of epithelial growths which alone have been transmitted, the stroma is variable in amount and is produced by the reaction of the invaded tissue. These facts are demonstrable in conditions of natural metastases also, as in the development of embolic foci in the liver.

Throughout the longest series of sub-inoculations yet attained each successive tumour has been composed of cells structurally identical with those of the original growth.

The transmissibility of new growths from mice is conditioned to a remarkable extent by racial distinctions among the mice inoculated. Thus a cancer originally growing in a German mouse meets a subtle antagonism when introduced into a French mouse, and gives a very low percentage of successes, but, as it becomes accustomed to the new race, the percentage of successes rises, and may ultimately equal that attained by direct inoculation of the original growth into German mice. Such specific distinctions between different races of the same species, reveal the possibility of a reaction even more subtle than that elicited by the specific precipitins which can distinguish the corresponding albuminous molecules of different species of animals, but not of different races within the same species (*Scientific Reports*, No. 2, Part ii.).

When introduced into other mice of the same race, the new growth appears to be independent of such factors as the age or sex of the mice inoculated, and the frequently high percentage of successes contrasts very strikingly with the relative infrequency of primary new growths in the same animals. The conditions required for the successful transplantation of a new growth cannot therefore be identical with those necessary to its primary origin, a fact which indicates that in becoming a new growth the cells have acquired potentialities which enable them to continue growing in circumstances inimical to their original development.

Phenomena of Cell-Division exhibited by Pathological New Growths.

Some of the most significant of recent observations on tumour growth relate to the phenomena of cell-division. In crder that I may be better able to make myself intelligible, allow me to recall to you the main features of the process as it occurs in healthy tissues.

As an exceptional occurrence, a cell may divide by a process of amitosis, or direct division, in which the nucleus

becomes simply constricted and separates into two parts, the cell likewise becoming constricted and later separating into two cells, each containing a portion of the original nucleus. This simple mode of bi-partition is limited to such highly specialised or degenerating cells as are found in glandular epithelium or temporary embryonic envelopes (Wilson).

The cell-divisions most characteristic of the development of animal and vegetable tissues are exceedingly complicated and constitute the process of indirect division, or mitosis, of which only the briefest outline can be given. Here the nucleus undergoes elaborate preliminary changes, both of physical and of chemical nature, the prophases of the mitosis. The chromatin reticulum becomes gradually transformed into a convoluted filament, the spireme, of more intense staining reactions. At first fine and closely interwoven, the filament forms the close spireme; later it shortens aud thickens to form the open spireme; ultimately it breaks across at intervals, giving rise to separate masses of chromatin, usually in the form of short bent rods, known as the chromosomes. These chromosomes become arranged equatorially upon the threads of a spindle-like structure, which has in the meantime made its appearance within the cell. Each chromosome splits lengthwise (metaphase) into two exactly similar fragments which gradually separate (anaphase) along the spindle-threads, so that precisely one-half of each chromosome diverges towards each pole of the spindle. The terminal phase, or telophase, consists of the division of the cell itself in the equatorial plane of the spindle, so that each daughter-cell contains one of the groups of chromosomes, from which the corresponding daughter-nucleus is reconstructed. The fundamental event in mitosis is the rigid distribution of one-half of each chromosome to each pole of the spindle, since it ensures that each daughter-nucleus shall contain exactly one-half of the chromatin originally present in the mother-nucleus.

From the time that the fertilised ovum first divides, and throughout all the cell divisions that go to make up the body of the embryo, this type of mitosis is maintained, and may be termed the somatic mitosis. Moreover, the number of chromosomes formed by each nucleus preparatory to division does not alter. It remains constant, not only throughout the development of the individual, but throughout all the individuals of

the same species, and it is invariably an even number. Thus in man, the ox, the guinea-pig, and the onion, the number is said to be 16; in the mouse, the salamander, the trout, and the lily, it is 24; in some nematodes it is as low as 2 or 4, and in some crustaceans as high as 168 (Wilson).

But not all the cells resulting from repeated segmentation of the fertilised ovum go to make up the body of the new individual. After a certain number of divisions the newly formed cells are called upon to play different parts. Some go to form the embryo, and by combined somatic divisions build up the body of the adult organism. Others go to form the embryonic envelopes and appendages, and yet others are early set apart as the precursors of the reproductive cells and become incorporated within the embryo. It is to the cell divisions met with in the third group that I now invite your attention.

At first the reproductive cells multiply in the same way as do the body cells; but, as they approach maturity, they exhibit types of nuclear division characteristically different from that exhibited by the body cells. The critical mitoses that precede the maturation of the sexual elements are known as the reduction divisions, since one of the more obvious of the points of divergence consists of a reduction of the number of chromosomes to exactly one-half of the number characteristic of the somatic mitoses. Of these divisions there are at least two, and in the higher animals only two, the first being distinguished as the heterotype, the second as the homotype, mitosis (Fleming). In the heterotypical division the reduced chromosomes assume peculiar forms, often appearing as loops, or rings, or tetrads, and their division on the spindle is not longitudinal but transverse. It is needless to enter into further detail. It is sufficient to emphasise the facts that reduction divisions are distinguishable from ordinary somatic divisions, that, in natural circumstances, they appear only in one tissue —the reproductive tissue—and there only at one phase of its development—that preceding the ripening of the sexual cells.

That this phenomenon is, in some way not understood, an essential preliminary to the propagation of new individuals, is indicated by its almost universal distribution. It has been found in all the higher organisms examined, animals and plants alike, marking the maturation, or a definite stage in the

maturation, of the cells set apart for reproduction. In animals, at all events, when all the critical mitoses have supervened, the cell is fully prepared for union with a matured cell of opposite sex, and, until this union is accomplished, no further development can, save in abnormal and exceptional conditions, occur.

A new generation is originated by the union of two mature sexual cells or gametes—the spermatozoon and the mature ovum. Each gamete contains within its nucleus half the number of chromosomes that are characteristic of the somatic mitosis of the organism arising from their fusion, and the union of the two gametes restores the full number of chromosomes to the resultant cell—the fertilised ovum—which is the first of the new generation. And throughout all the cell-generations of the new organism the full number of chromosomes will be retained, except in the maturation divisions of its reproductive cells, when they in turn make their final preparations for that union which will introduce the next succeeding generation.

We are now in a position to consider the phenomena of cell-division as it appears in cancer and other pathological new growths. Cytologists have for many years been familiar with the fact that derangements of the mechanism of mitosis are common in cancer cells, and that in tumours of rapid growth the processes of cell-division may exhibit extreme disorder (Klebs, Hansemann, Galeotti, quoted by Wilson). Such derangements include asymmetrical mitoses, the chromosomes being unequally distributed to the daughter-nuclei, and multipolar mitoses, in which more than one spindle is formed. Even amitosis, or direct division, is not infrequently met. Similar abnormal mitoses may be artificially induced by the action of irritants or poisons, *e.g.* in the epidermal cells of salamander by antipyrin, potassium iodide, etc. (Galeotti, quoted by Wilson).

But it was left to Farmer, Moore, and Walker to discern a certain orderliness in this disorder, and their discovery, communicated to the Royal Society in December 1903, was as simple as it was significant. They found that, at the primary site of origin and within a zone behind the advancing margin of malignant growths, the cells of the tumour were dividing after the manner of the heterotypical mitoses of reproductive tissues. Not only were the chromosomes of the dividing

nuclei reduced to a number approximately half that of the somatic divisions, but the resemblance extended to other and often to minute points of detail, including the disposition of the chromosomes in the form of loops, rings, and tetrads, and their transverse division on the spindle. In other words, they demonstrated in the newly formed cells of primary cancerous growths processes of cell division which all biological research has shown to be characteristic of the maturation, or of a definite step in the maturation, of the reproductive cells preparatory to conjugation.

Endorsed by the high authority of Professor Farmer and his colleagues, the similarity of cancerous tissue, at a certain stage of the primary new growth, to reproductive tissue, is a fact of the utmost moment in relation to tumour growth. The attainment of the critical mitoses indicates that the cell has entered upon the terminal phase of its existence as a cell of the old generation, and that it is now ready to initiate a fresh life cycle, a new growth of cells, an independent organism. It does not indicate that a new generation of cells has yet arisen.

A further significant resemblance between the cells of cancerous and those of reproductive (gametogenic) tissues has recently been described by the same observers. In cancer cells there are frequently encountered clear vesicular bodies containing small deeply staining granules, but their nature has long been an enigma. Occasionally they have been described as some form of protozoon parasite, whose presence stimulates the cell to undue proliferation and is the excitory factor in the ætiology of tumour growth. The presence of such cell-inclusions has formed the basis of many hypotheses regarding the parasitic origin of cancer. The parallel raised by Professor Farmer and his colleagues suggests a wholly novel solution. They point out that in the final metamorphoses of the spermatozoon in the vertebrate class of animals, a vesicular body, the archoplasmic vesicle, containing one or more darkly staining granules, is developed alongside the nucleus, and may attain such a size as to indent and deform the nucleus. The vesicle with its contents ultimately persists as the so-called "cephalic cap" of the spermatozoon. This phenomenon is a conspicuous and, so far as is known, a constant characteristic of spermato-

genesis in the vertebrata, and is known to have an even wider distribution. In its general appearance the archoplasmic vesicle strikingly resembles the vesicular inclusions of cancer cells and, as these authors conclude, "it is not, perhaps, accidental, that just as in the case of nuclear divisions, so also in the cellular inclusions, a parallelism between the cells of reproductive tissues and those of cancerous growths should be found to exist." But they do not on this account regard cancer cells as identical with sexual cells.

Of the fresh observations for which Drs Bashford and Murray, of the Imperial Cancer Research Fund are responsible, the majority deal with the nature and distribution of the mitoses in cancer cells. The work of Jensen and of Borrel on the transmissibility of cancer in mice, and that of Farmer, Moore, and Walker on the resemblances between certain cells of cancer and those of reproductive tissues, provided an opening of which they were not slow to avail themselves. While emphasising the difficulties that attend the interpretation of the numerous forms of abnormal mitoses in cancer cells, they showed that heterotypical forms occurred not only in cancers of human origin, but also in those of lower animals, including such widely divergent types as the horse, cow, dog, cat, mouse, and trout, that, in fact, the resemblance of cancer cells at a certain stage in their life-history to reproductive cells approaching maturation is a phenomenon inferentially present in all cancers of vertebrate animals.

While thus confirming and extending the observations of Professor Farmer and his colleagues, they indicate other significant phenomena. I understand that, in their experience, somatic types of mitoses in which the nuclear divisions exhibit the full, unreduced number of chromosomes are in full developed tumours more common than reduced divisions and that, whatever be the age and extent of the cancer, ordinary somatic mitoses are almost invariably present at certain stages and in certain conditions of growth. It is thus that the cells multiply at the advancing margins of malignant growths, whether primary or secondary, and thus that they multiply when, detached from the tumour mass, they undergo the initial proliferation that starts a natural metastasis or an artificial transplantation. Not only, therefore, does the heterotype and post-heterotype tissue

form only a small proportion of any extensive new growth, but the cells which are youngest in time and presumably oldest in descent almost invariably exhibit somatic mitoses. Once the reducing divisions have appeared in reproductive tissues, the cells that are youngest in time and oldest in descent are in animals represented only by the mature and maturing sexual cells, and in animals and in plants alike are known to multiply only by mitoses in which the number of chromosomes is reduced by one-half. Not all the cells of cancerous growths can, therefore, be regarded as comparable to reproductive cells. After a time there must intervene some circumstance which restores the somatic mitoses, and, apart from parthenogenetic development, in which the ovum is fertilised by one of the polar bodies, there is only one event which is known to have this effect.

It is, as we have already seen, the conjugation of two cells, already prepared for union by a sequence of reducing divisions, that restores the full number of chromosomes to the resultant cell, and originates a new generation. This phenomenon, too, has been described (Bashford and Murray). In transplanted cancers of mice, nuclei are found staining more darkly than usual, and drawn out into blunt processes as if amœboid Frequently one of these processes becomes closely applied to an adjacent cell wall. Occasionally the nucleus of the cell may be seen in contact with that of an adjacent cell, and apparently continuous with it. So far as I am aware, this conjugation of resting nuclei has been observed only at certain stages in the growth and development of transplanted tumours in mice. Though it has not yet been observed at the primary site of cancer, the reports of the Cancer Research Fund insist on the view that some circumstance equivalent to conjugation is both requisite and adequate to explain the salient phenomena of the growth, as distinct from the origin of cancer. It is argued that only a new generation of cells, constituting in all essential respects a new organism, could be endowed with that independent and autonomous growth characteristic of a neoplasm.

Both Professor Farmer and Dr Bashford draw a comparison between the intercurrent relations of certain cell generations in plants and the relation of neoplasia to an animal organism. I

propose rather to emphasise a relation between recurrent cell generations in animals which constitutes a still closer analogy. In marsupials, and to a greater extent in the higher mammals, the new generation originating in the fertilised ovum is for a time definitely parasitic upon the old generation—the maternal organism—and the relation of the fœtal chorionic epithelium to the maternal decidua is essentially that of a neoplasm of restricted malignancy so far as local infiltration and independence of growth is concerned.

The chorionic epithelium is already a new generation and already parasitic in relation to the maternal organism, but its growth is limited and its natural term of life restricted within the gestation period of the species. When it becomes cancerous, it is peculiar among cancers in being one generation further removed from the organism in which it grows, that is, altogether two generations removed if the cancer itself represents a new generation, and though embryonic in relation to other tissues, it is intrinsically senescent.

The new generation—neoplastic and embryonic alike—grows independently of the requirements of the parent organism, but it is at the same time wholly dependent on the parent for its nutrition. In this relation of mutual dependence and independence no distinction whatever can be drawn between the new growth of a tumour and the new growth of a mammalian embryo. Where these two types of new growth fundamentally differ is in the regulated and orderly growth of the embryo and its envelopes, as opposed to the unregulated and disorderly growth of the tumour. Of this difference no explanation has been advanced. The origin of a cancer from the conjugation of cells would be sufficient to explain its independence in the sense above defined, but inadequate to explain its autonomy. A new organism with laws of growth of its own is an entity unknown in the whole range of normal biological development. Every new generation has most rigidly impressed upon it the laws of growth to which its parents have conformed, only minor variations being permitted. But in the development of a cancer we find the unprecedented phenomenon of a new generation of cells growing independently of, and often at variance with, the laws that regulate the growth of the parent tissue.

Recent observations in biological science have indicated a unit of living matter beyond the cell, beyond the chromosome—a unit consisting of the chromatin granule (chromomere). Boveri and Brauer (quoted by E. B. Wilson) regard the splitting of the chromosomes as an independent reproductive act of the chromatin. "In my opinion," adds Brauer, "the chromosomes are not independent individuals, but only groups of numberless minute chromatin granules which alone have the value of individuals"; and Wilson endorses this opinion in the words, "These observations certainly lend strong support to the view that the chromatin is to be regarded as a morphological aggregate—as a congeries or colony of self-propagating alimentary organisms capable of assimilation, growth, and division." The chromatin forms the hereditary basis by which the processes of growth and differentiation are controlled, and from which they receive the specific stamp of the race (E. B. Wilson), and the accurate subdivision of the chromatin in mitosis is commonly regarded as the mechanism by which genetic continuity and consistency are maintained. In the normal development of the embryo an abnormal mitosis is rare, whereas in neoplasia, and particularly in malignant forms of rapid growth, pathological mitoses are abundant, and may indeed be so frequent as altogether to obscure the nature of the nuclear divisions. While I am fully aware that the significance of fertilisation and mitosis is one of the vexed questions in biology, it may not be unreasonable to correlate the regulated growth of embryonic tissue with the accurate subdivision of chromomeres, and the unregulated growth of cancerous tissue with the frequent irregularities in chromatin distribution.

So far as they have been observed, the mitoses in transplanted growths exhibit no abnormality such as would cause an unequal subdivision of chromatin even at the periods of gametogenic activity, and, further, the successive new broods of cancer cells show no deviation from the structure of the original brood throughout the longest period of observation yet attained, and appear to be subject to precisely similar laws of growth. Deviation in structure to a slight degree, and liberation from the original restrictions of growth to a greater degree, probably therefore depend on the extent of the uneven

distributions of chromatin, attendant on the origin of the primary generations.

The Relation of Neoplasia to Senescence of Tissue

The well-known fact that the liability to malignant new growth increases with the lapse of years, the so-called "age-incidence" of cancer, has acquired a fresh significance in the light of recent work. It is commonly stated that sarcomata are more frequent in the early years of life, while cancers are more frequent in the latter. It is interesting to note that the recent statistical report of the Imperial Cancer Research Fund indicates that sarcomata, like cancers, increase in frequency as life advances. In my own experience I have been impressed with the fact that cancers form a much larger proportion of the malignant new growths occurring in young persons, and even in children, than is commonly supposed. It appears, therefore, that while either of the main types of malignant new growth may occur in the young, yet the frequency of both increases with advancing years.

If this phenomenon be frequently analysed, it is found that the increase does not uniformly progress. Cancers of the stomach, for example, appear, and attain a maximum frequency earlier than cancers of the skin; cancers of the uterus and mamma are more frequent towards the decline of reproductive activity than in the later years of life; and cancers of chorionic epithelium closely follow the appearance of that epithelium. It is not so much, therefore, the age of the individual in whom it occurs, as the age of the tissue in which it arises that determines the maximum incidence of cancer. Even as regards the tissue, it is not, strictly speaking, its age, but its senescence that is the important predisposing factor. Tissues appear to be liable to neoplasia when, having attained maturity, they enter upon the phase of decadence or involution, and this phase is reached by different tissues at different periods in the life of the organism. Moreover, the same tissue (*e.g.* mamma, uterus) may become effete at different periods in the life histories of different animals, and the age-incidence of cancer correspondingly varies. This is well illustrated by Professor Woods Hutchinson, who, in his

"Studies in Human and Comparative Pathology," correlates the relative infrequency of mammary and uterine cancers in the lower animals with the fact that these organs remain actively functional nearly to the end of life; in other words, that the lower animals do not outlive these organs to the same relative extent as does the human subject. The reports of the Imperial Cancer Research Fund also insist on the importance of the age-incidence in the ætiology of cancer, and emphasise the fact that the same relation of cancer to decadence of tissue obtains in man and in other animals, though in the latter, with their shorter tenure of life, the period of relative immunity is correspondingly shortened. The widely recognised influence of irritation and of injury in predisposing to tumour growth is conceivably and probably operative only in so far as it accelerates senescence of tissue.

The relative infrequency of new growths in animals other than man is probably due to various causes. If their brief tenure of life shortens the period of comparative immunity, still more does it abbreviate the period of maximum liability, and I am not aware that an average growth of cancer becomes more rapid in short-lived animals. Further reasons for this difference may be found in the facts that the habits of animals do not predispose so frequently as in man to premature senescence of tissue, and that organs which in the human subject undergo involution many years before the natural term of life, in animals may remain functional to the end. And particularly in the case of wild animals in natural conditions, is it true that those approaching decrepitude are either killed off or die of starvation. The important point is, not that new growths are less frequent in animals than in man, but that a consideration of the causes of this relative infrequency serves only to emphasise the significance of tissue senescence as a factor in the origin of new growths.

Following out this relation of the incidence of neoplasia to the age limit of tissue activity, Dr Bashford and his colleagues were led to a remarkable observation. The animal in which transplantation of tumours from one individual to another has been most successfully effected is the mouse, whose natural term of life is about three years. Within this brief compass there are condensed the vital activities which in man may

occupy more than half a century, and the processes are correspondingly shortened. Thus, gestation in the mouse is completed in three weeks, while in man it occupies nine months. But new growths from mice had been propagated through generations of other mice over a period far exceeding the average duration of life in mice. It was natural, then, to enquire how the new growth came to be endowed with this apparently limitless power of growth without deviation from its original structure. A systematic examination of such transplanted cancers revealed the discovery that the growth was not continuous but interrupted; that at periodic intervals there appeared a number of associated phenomena, including heterotypical mitoses and nuclear conjugations. The onset of these phenomena is related, I understand, not to the age of the animal or to the duration of the tumour growth within it, but solely to the number of cell-generations of new growth that have intervened between the last preceding heterotypical mitoses, that is, in the strictest sense, to the age of the new growth. Just as mice, after a few years, would become extinct unless new individuals were generated by the union of reproductive cells, so apparently a maturation of gametes and their conjugation becomes at recurrent and definite intervals of time essential to the propagation of the cancer. This, if it can be substantiated, is the strongest argument yet adduced in support of the hypothesis that a new growth is essentially a new generation of cells arising after the manner of a new individual of the species. Nevertheless, it raises fresh difficulties.

That the senescence of the cells of the new growth should be the only apparent factor in determining the whole sequence of these phenomena in transplanted tumours is altogether remarkable. Consider for one moment what it means. There is abundant evidence that reducing divisions in non-reproductive tissues are not necessarily indicative of malignant new growth. They have been encountered not only in benign tumours, but also in proliferations of tissue of an inflammatory or irritative nature. Moreover, they may not be observed in some new growths of an undeniably malignant type. So far from their presence being a criterion of malignancy, it is not even a criterion of a new growth, nor does a new growth inevitably follow upon their appearance in a tissue. All that they signify

is that the tissue is so far prepared for the initiation of a new growth that certain of its cells have in some way been induced to acquire the characters of reproductive cells undergoing maturation. Granted, then, that the senescence of the tissue, naturally or artificially produced, is adequate to determine the onset of the reducing divisions, nevertheless in the primary growth of a cancer it cannot be the only ætiological factor, since not every obsolete tissue gives rise to a new growth; since, even when maturation divisions have supervened, the tissue does not necessarily undergo neoplasia. Presumably, the additional factor is some form of cell conjugation, and this in turn requires some stimulus not invariably present even when the conditions as to senescence of tissue and maturation of gametes have been fulfilled.

Not all cancers can be successfully transplanted, but, if I interpret the observations aright, a successful transplantation does not depend upon the immediate initiation of a new generation of cancer cells in the new animal. I understand that the initial proliferation of a transplanted growth consists of cell generations continuous with the preceding cell generations, and that, once the cancer cells have started to grow in a new animal, they have never failed to continue to grow in that animal. Presumably, therefore, a transplanted cancer has never failed to propagate new generations of cancer cells when it approaches the age limit of its growth. There may be a failure to infect a new animal, but apparently never a failure to propagate a new breed of cancer cells, whatever be the age or sex, or other condition of the animal in which the cancer is growing. Why the origination of the secondary generations in transplanted cancer should be independent of that infrequent conjunction of conditions required to start the primary generation is a problem that awaits solution.

On the hypothesis that a new growth consists of a new generation of cells, it is not easy to understand why it should so infrequently follow upon the primary appearance of reducing divisions in somatic tissues, and so inevitably follow the recurrence of the reducing divisions in transplanted growths; whereas on the view that a new growth is analogous to a mass of reproductive (gametoid) tissue, the difficulty disappears. Once the primary differentiation from somatic to reproductive (gametoid)

tissue has been effected, then subsequent maturation of the gametoid tissue might be expected to recur at periodic intervals in transplanted masses, whether in the same or in other individuals, and the infrequency of a spreading new growth as a result of the primary differentiation presents no difficulty in view of the well-known and often extreme differences in cell vitality.

Professor Farmer and his colleagues had noted the occurrence of somatic mitoses in the proliferating cells of the advancing margin, but regarded them, as doubtless they would regard similarly dividing cancer cells elsewhere, not as the descendants, but as the precursors of the cells undergoing reducing divisions. Until it has been shown that the conjugation of resting nuclei is a constant phenomenon at certain stages of tumour growth, it is not possible to prove that the somatically dividing cells are the products of the union of gametes. The data accumulated by the Imperial Research Fund on the appearance of recurrent cycles of nuclear changes in transplanted tumours of mice afford a certain measure of presumptive evidence in favour of both views, though the hypothesis of the origin of cancer as a new generation is certainly more consistent with other known facts of tumour growth. It must be admitted, however, that the phenomena described by Bashford and Murray as effective nuclear conjugations are capable of bearing other interpretations, notably that of imperfect and abnormal forms of division, or merely that of abortive conjugations. It is undoubtedly a further objection that these reputedly effective nuclear conjugations occur between gametes matured not only in the same organism but side by side in the same tissue—a circumstance which demands the assumption of a phylogenetic reversion to an extent unparalleled in biology.

The gametogenic tissue of animals does resemble a new growth in so far as its cells ultimately form highly independent individuals—independent of the needs of the organism and independent of each other. Moreover, although their growth is not unregulated and aberrant as in cancer, it is, during the period of reproductive activity, unceasing and practically unlimited. If a similar twofold independence and unlimited growth could even for a time be acquired by a group of somatic cells, the product would not greatly differ from a cancer with a

limited tenure of life. And, if it be objected that the life of a cancer may, so far as we know, be unlimited, it must be borne in mind that a patient may outlive a new growth, and not rarely does outlive the less malignant forms presumably endowed with a smaller measure of vitality.

In this relation I once more quote that eminent biologist, Professor E. B. Wilson, who says: "As far as we can see from an *a priori* point of view, there is no reason why, barring accident, cell-division should not follow cell-division in endless succession in the stream of life. It is possible, indeed probable, that such may be the fact in some of the lower and simpler forms of life where no form of sexual reproduction is known to occur. In the vast majority of living forms, however, the series of cell-divisions tends to run in cycles, in each of which the energy of division comes to an end, and is restored only by an admixture of living matter derived from another cell" (fertilisation), and he adduces evidence that even in unicellular animals, infusorians, the processes of growth and division sooner or later come to an end, undergoing a natural senescence, which can be counteracted only by conjugation. He concludes, "That fertilisation in higher plants and animals does in fact incite division and growth is a matter of undisputed observation. We know, however, that in parthenogenesis the egg may develop without fertilisation, and we do not know whether the tendency to senescence and the need for fertilisation are primary attributes of living matter." It is possible to find in these quotations some measure of support for each of the hypotheses under discussion. It is only fair to point out, however, that neither is regarded by its authors as more than a tentative working hypothesis to be discarded when fresh discoveries have revealed its insufficiency, but meantime to be put to its legitimate use as a means of co-ordinating known facts, and as a guide to future research.

In this relation also, I would again emphasise the fact that the cells which ultimately form the reproductive tissue are of the same generation as those which go to form the embryonic envelopes (trophoblast) and those which go to form the body of the mammalian organism. They are all descendants of the fertilised ovum, derived from it by repeated mitotic division, and for a time indistinguishable one from another. It is perhaps

not too much to assume that cells so intimately related in origin, however much they may ultimately differ in structure and in function, should retain certain tendencies in common, and in particular that, just as reproductive cells approaching maturity make preparations of a very special kind for conjugation with other specially prepared cells, so something of the same tendency has descended to the non-reproductive cells also. It is not inconceivable that such a common heritage should be evidenced only when the other vital activities of the cells begin to cease, when the onset of senescence reveals the need for a further renewal of energy. This is not inconsistent with the fact that the higher the differentiation of the tissue of origin, the more restricted is the differentiation of its progeny in the form of a new growth or otherwise.

The occasional occurrence of heterotypical mitoses in senescent tissues, with or without the subsequent conjugation of matured gametes, might thus be regarded as the fulfilment of a natural law, as the ultimate realisation of a potentiality latent throughout the greater part of the life history of the cell, being obscured by other, and for the time being more urgent demands on its vital energy. It is not impossible that tumour growth will prove to be a natural phenomenon, determined by a definite concatenation of natural circumstances, of which one is the senescence of the tissue, and that the nature and origin of cancer will be essentially a problem of biology, and only accidentally a problem of pathology.

The Relation of Chemical Conditions to Tumour Growth.

The intimate relation of chemical conditions to biological processes has been demonstrated most strikingly by Loeb, whose results have been abundantly confirmed by subsequent research. It may be accepted as proven that the development and growth of living cells may be profoundly modified by slight chemical alteration in their environment. Perhaps the most remarkable of all these observations relate to the development of the unfertilised ova of certain echinoderms, notably sea-urchins and starfish. In these animals the sexes are separate, and development of a new organism naturally occurs

only by the union of two mature sexual cells suspended in sea water. Loeb, however, by minor, though definite alterations in the saline constituents of the water, was successful in causing the unfertilised ova to segment and develop just as if they had been fertilised by the spermatozoon, and in suitable circumstances the segmenting ova could be induced to form actively swimming normal larvæ. Not only in the echinoderms, but also in annelids (segmented worms), in which also the sexes are separate, an artificial parthenogenesis could be similarly induced, so that free swimming larvæ were developed from unfertilised eggs. In this artificial parthenogenesis only one polar body is given off, so that there is no reduction in the number of chromosomes: where there is a reduction the normal number soon becomes restored by a process of auto-regulation (Delage).[1] That it should be possible by a comparatively slight variation of chemical conditions to induce in the ova of sexually developed animals a reversion to a non-sexual form of development (parthenogenesis) is not without possible significance in relation to neoplasia.

These phenomena are not merely scientific freaks. They acquire a new importance in view of the work of Professor Moore and his colleagues, on the reaction of the gastric secretions in cases of malignant disease. As these authors indicate, it was one of the few definite facts known about cancer, that when the stomach was the seat of the new growth, the secretion of free hydrochloric acid was nearly always in abeyance, and it was also known that this might occur even when the growth was of small dimensions and had not produced any other noticeable alteration in the stomach. I do not propose to discuss the various suggestions that have been advanced in explanation of this phenomenon, nor the observations made on the effect of new growths in different positions in the stomach, nor the occurrence of diminished acidity in other morbid conditions.

It occurred to Professor Moore and his colleagues to investigate whether this phenomenon was independent of the site of the cancer, and they found—I give the findings in their own words—that "the absence of free hydrochloric acid in cancer of the stomach is not due to any local action in that

[1] I am indebted to Professor Haswell for this reference.

organ, for hydrochloric acid is absent or greatly reduced in amount whatever may be the situation in the body of the malignant growth. The amount of free hydrochloric acid present in the stomach contents was determined in seventeen cases of malignant disease situated in different regions, such as the uterus, mamma, prostate, rectum, tongue, cheek, and mouth, and in about two-thirds of the cases the free hydrochloric acid was found to be entirely absent, while in the remaining cases the amount found was much below the normal, being reduced to a mere trace in all except one case, where it reached about one-fifth of the average amount obtained in control determinations carried out upon ourselves." Since the phenomenon is independent of any local action in the stomach, and since, moreover, it is so pronounced and constant, so far at least as the limited number of observations recorded can justify such a statement, it certainly suggests a profound chemical alteration in the body fluids, and, as the authors point out, this change may be a common cause of the new growth and of the absence of the acid, or it may be a result of the growth and the cause of the absence of the acid. The cause of the absence of the acid, however, is not yet determined. It may be that the oxyntic cells are atrophied, or inhibited by some toxic substance in the blood, and the presence of a ferment (malignin) within cancer cells, and liberated by their disintegration, has been described (Petry and Blumenthal). Nevertheless it is more probable that the explanation must be sought in the chemical constitution of the blood itself, and that the elimination or arrest of free hydrochloric acid is an indication "through the mechanism of the oxyntic cells," that the essential acidity of the blood is decreased and its essential alkalinity increased. Dr Rennie has suggested that an increased alkalinity of the blood plasma might be determined by some disturbance in the nervous control of metabolism, such as is indicated in the contrasted condition of acidosis and diabetes. These facts and considerations further illustrate the extended scope of modern pathology and its relations to, and foundations in, biology, chemistry, and physics. I must regret that time does not permit me to discuss other recent contributions, notably those of Ribbert, of Beard, and of the many cancer research institutes.

Indications for the Treatment of New Growths.

When the cells of one animal are repeatedly introduced within a second animal of a different species, it frequently happens that substances antagonistic to these cells are developed in the body of the inoculated animal. If now some of the blood serum from the second animal be injected into an animal of the same species as that from which the cells were originally taken, the serum may exert a destructive action on these cells. It is upon this general biological law governing the ultimate reaction of living cells to alien albuminous molecules that the principles of immunisation against bacterial infection are based.

Whether we regard a tumour as a new generation of cells or not, the fact remains that it constitutes an invasion of the organism by a brood of independent and hostile cells, and in the sense in which we have defined the process, it is equivalent to an infection. It seems not unreasonable to hope that substances antagonistic to the cells of a new growth could be developed in the blood of an otherwise suitable alien animal by injections of the tumour cells, as in the process of immunisation, and that the blood serum would then be used with effect either to inhibit or to destroy further growths of the same tumour or growths of other similar tumours. The extremely restricted specificity of the actions of living tissues to cancer cells, so that evidence of a difference is obtained among closely related cancer cells from the same species (*Scientific Reports*, No. 2, Part ii.), indicates a possible difficulty in the preparation of a serum antagonistic to other new growths of similar structure to that used in its preparation, though such distinction might not be apparent when injections were made into alien animals. Already considerable attention has been paid to this possible development, but as yet no certainty has been attained.

The remarkable agencies revealed within the last few years by physical science have been impressed into the service of medicine, and their influence on tumour growth is now on its trial. The effect of radium on transplanted new growths of mice has been investigated by the Cancer Research Fund, and, since the life history of these tumours has been under continuous observation for several years, the results obtained may be regarded as independent of the numerous sources of error

which discount the value of merely clinical experiences. Moreover, as the experimental results corroborate the earlier clinical observations, a considerable body of evidence has now accumulated in support of the fact that radio-active bodies and solutions do in a most surprising and apparently capricious manner cause the disappearance of some tumour growths, though not of all.

Pieces of radio-active lead, solutions of radium-emanation, and sterile radio-active saline solutions were used. The duration of each exposure varied from three to thirty minutes, and was repeated for the same length of time on the following days. Within the second week after the first exposure, four of the tumours began to diminish in size, while others continued to grow. There was no noticeable relation between the length of exposure and the effect on the tumour. The influence of radium in producing absorption appeared to be directed to the connective tissue elements, which underwent marked proliferation, and split up the tumour into smaller islets of cells. Even at this stage the tumour cells appeared healthy, but within a few days they degenerated, then died, then disappeared, probably owing to cicatricial contraction of the fibrous overgrowth. These observations confirm the previous work of Exner, and controvert the more common assumption that radium exercises a selective action on the tumour cells. The Röntgen rays (X-rays) have also been employed in the treatment of cancer, and some measure of success has been recorded in superficial forms. I am not aware, however, that their influence has been submitted to any such rigorous test as that undertaken for radium. It is known through the extensive researches of Heinecke that exposure to the Röntgen rays or to radium produces alterations in the spleen and lymphatic glands, and several accounts have recently appeared of the successful treatment by X-rays of leucocythæmia—a condition recognised to be closely related to, if not identical with, neoplasia.

I have grievously failed if I have raised any false hopes that the treatment of cancer by any means other than actual removal is yet practicable. It is obvious that to be effective the removal must be early, free, and careful, and the lamentable disregard of one or other of these precautions is responsible for

many disasters. Patients should be encouraged to seek advice in the early stages of suspicious tumours, and the surgeon should remember that these are not cases for expectant treatment nor for conservative surgery. I do not advocate wholesale butchery, but I do advocate the common-sense application of known facts and scientific methods to the surgical treatment of tumour growth. In these days there is no reason why every doubtful tumour should not be submitted to a microscopic examination. If you are still in doubt whether the condition is inflammatory or malignant, give the patient the benefit of the doubt and remove the suspicious mass. Remember that prolonged irritation induces senescence of tissue and predisposes to neoplasia. If you are in doubt whether the growth is malignant or benign, remember that all are potentially malignant, that the difference is more of degree than of kind, and do not hesitate to remove it. If you are satisfied that a malignant growth has really started, bear in mind the ease and rapidity with which secondary infections may occur, and do not risk losing a life for the sake of saving a little tissue or even a limb. The knife should never be within an inch of the new growth, and, where possible, many inches should intervene. I do not need to warn this audience against those secret nostrums which, born of cupidity and nurtured in credulity, if they do not aggravate by irritation, serve only to delude the patient into waiting until perchance the time for operative interference has passed.

Addendum.

Since this address was delivered I have been repeatedly asked whether there is any foundation for the not uncommon belief or suspicion that cancer is contagious or infectious. While I am fully aware of certain recorded instances of the communication of cancer from one person to another (*cancer à deux*) and of the existence of so-called cancer houses and cancer districts, I cannot too strongly emphasise the fact that the difficulties attendant on the artificial transference of new growths sufficiently demonstrate that cancer is neither contagious nor infectious. The hypothesis that cancer is due to the invasion of parasitic microbes is far from being sub-

stantiated, and, even if it should later be proved that the phenomena of cancer are initiated by some form of parasite, it does not necessarily follow that cancer is contagious or infectious. On the contrary, it must be admitted that the distribution of the presumptive parasite and its mode of action are wholly dissimilar to those of any known bacterium or protozoon, and that in particular it is not capable of reproducing the disease in other persons after the manner of other morbific agents known or assumed to exist.

TRANSITORY HEMIPLEGIA, WITH NOTES OF TWO CASES

By HAMILTON GRAHAM LANGWILL, M.D., F.R.C.P.,
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THAT an individual may be seized suddenly with a typical hemiplegic attack from which he recovers perfectly within a period of time to be counted rather by minutes than hours is, I venture to think, a fact not so widely recognised as it should be. And yet the recognition of the existence of such a variety of hemiplegia is of no little importance to the practitioner. For the first question put to him (as soon as he has seen the patient he has been so hurriedly called to) usually takes such a form as, "Is it a shock of paralysis, doctor?"—meaning thereby an affection which will confine the patient to bed certainly for days, and probably even weeks. If the doctor's reply is affirmative, there naturally rises to the mind of the anxious relatives the mental picture of the disabled hemiplegic patient which is only too familiar, even to the public eye.

Or, again, the friends may ask (for in these days the public dearly loves to air its scientific knowledge, however scanty), "Is it a blood-vessel in the brain given way?" Should the family doctor, having excluded the probability of embolism (from previous knowledge of his patient's health, or as a result of his recent examination), reply that he thinks it is, he may find it somewhat difficult to explain to the friends the perfect

recovery of his patient, perhaps even before he has left the house.

That the hypothetical picture thus drawn is not exaggerated will be evident, I hope, from the account given below of two typical instances of such a seizure. They are not the only ones occurring in the writer's experience, but the successive recurrences in the first case stamped the case deeply on his mind some twelve years ago, notes of the case being repeatedly taken, while the second case had an even deeper interest, for reasons which will be evident in the case record. The notes of the two cases may be summarised as follows :—

CASE I. P. Q., æt. 57, a stout, florid man, not altogether temperate ; previously healthy, but once had a "faint on the street." I was called hurriedly, at 6 P.M., on June 22nd, 1893, to his house, as "he had taken a shock." I found him sitting, half supported, in a chair, with his *left* arm hanging helpless and the face "drawn" to *one* side from paralysis of the left side of the face. The history of the onset was as follows: When out in the street, talking to a friend, he felt "queer," and asked his friend to support him. This attack passed off soon, and he then took a walk to get over it, but, feeling ill again, he made for home, "feeling his way" (*i.e.* supporting himself) "along the wall," he says. When he reached his door, he could not get his foot up to the doorstep (3 inches), and his wife, hearing the noise, thought he had got stuck in the doorway with something he was carrying in. On going out to see what was wrong, he said to her, "I can't get in at the door," his speech being thick and muffled. He was helped into the house, and soon recovered, but shortly thereafter the third attack came on—the one in which I saw him—which lasted fully half an hour. His face, arm, and leg were paralysed on the left side, his speech was very blurred, and the spittle ran from one side of his mouth. On getting him lifted into bed, and testing the motor conditions of his left side and finding them completely powerless, I was talking to his wife about what would have to be done for him, when suddenly the patient said, "Now I am all right," and he lifted his left arm and leg easily, the face also becoming normal. He then told me that the first thing he observed was a dimness over the

eyes, followed by a "murring" (tingling?) in the face, arm, and leg, almost coincident with the loss of power. Consciousness was quite retained, and he had a sensation of "needles and pins" in the whole left side; and, as the power returns *suddenly*, the prinkling goes off. He says he feels the power come back to him "like a flash." He has no pain. His pulse was regular, tension not specially high; cardiac sounds appeared normal. Urine showed neither albumen nor sugar, s.g. 1025.

The following day he had two similar attacks, the next day he had again two, but he thought the attacks were shortened by the use of the nitro-glycerine tabloids he had been ordered. He was a most difficult patient to treat, obstinate and self-willed, and, objecting to the treatment I advised for his health, he passed into another doctor's hands. Three years later (1896) he called to see me, owing to an attack of paresis of *right* arm and leg, with muffling of speech. This attack had come on a few hours before, and was passing off, he said. Within the previous month he had had at least three such attacks, some on the right, some on the left side.

CASE II., A. Z. Patient, who is a professional man living quietly in the country, and has been all his days naturally a man of great energy and boyish enthusiasm, was aged 71 at the date of his attack five years ago. Beyond a severe attack of influenza with pleuro-pneumonia in 1890, he has scarcely ever ailed, except that for about the last dozen years he has frequently suffered from pain over the front of the chest when walking quickly or uphill, the pain passing off almost immediately if he stops walking, and especially if he at the same time gets rid of "wind" from the stomach.

In the winter of 1900-01 he began to be troubled with aphasic symptoms, especially loss of the memory of words. On this account he sought further medical advice in Edinburgh, and I went with him to a well-known consultant, who was of opinion that his symptoms would probably improve by a course of treatment on "anti-gouty" lines, as he was rather full-blooded. Up till this time the patient had exhibited no loss of *motor* power, further than occasionally experiencing a slight difficulty in some of the finer movements of the fingers,

e.g. in using a small salt-spoon. His gait was perfectly natural, very elastic for a man of 71; and he easily walked to my house from the consultant's, fully two miles. The following day patient went by car to Edinburgh, intending to return as before to dinner; but in the afternoon word reached me that he "had had a shock" in his club, and that he was being removed to his home in the country, 40 miles by rail. I followed by the next train, and on reaching his house about 9 P.M. I found him half-reclining in his arm-chair, speechless, and showing a typical hemiplegic appearance, viz. powerless *right* arm and leg, saliva dribbling from his mouth, and the face markedly "drawn" to the sound side on smiling. Now, it is instructive and interesting to note the history of this condition. The patient had recovered from the attack in Edinburgh so completely as to be able to walk from the station to his house (fully half a mile), and after a meal he had been out for a stroll in his garden, walking perfectly well, with his usual springy gait. He was sitting chatting with his family when this second seizure came on, just as I approached the house; indeed, I had noticed (through the half-open Venetian blinds) the excitement in the room as I crossed the lawn. The exact nature of his attack in Edinburgh I had, of course, no means of judging of, but here seemed to be a typical attack of complete loss of motor power of *right* leg, arm, face, and speech, with all the semblances of an ordinary paralytic "shock." He was quite conscious, and pointed to his tongue and foot, indicating his inability to make them work. His son ran off to telephone for the family doctor and was fortunate to find him in the village "call-office," so that he was by the patient's side in about twenty minutes. The patient was still speechless and hemiplegic, so we carried him upstairs to his bedroom. We were stooping down, unlacing his boots, when suddenly a familiar voice was heard to say, "I'm all right now," and, surely enough, our aphasic hemiplegic patient not only spoke clearly and stood up unaided, but to show his perfect recovery, he further, in keeping with his naturally boyish manner, began to dance! Fearing another seizure, I sat up with him half the night, but from that day he has never had another attack, and though now 76 he can walk six miles easily, with a more springy gait than many a man of 50. His aphasia has also been much less trouble-

some, and he exhibits no sign whatever of any of his former fugitive motor impairment.

From the above notes it is evident that these two cases present several points of close similarity. In each patient there occurred a sudden seizure, having all the features of a typical hemiplegic attack without loss of consciousness, perfect recovery of motor power following in less than an hour, while in Case I. these seizures recurred repeatedly. In neither instance was there left any trace of motor enfeeblement in the previously hemiplegic area, although ultimately before his death (in 1897), Case I. developed the usual paralytic symptoms associated with sclerosis of the cerebral arteries.

Now, what is the most probable explanation of such an attack? In the differential diagnosis of the causation of hemiplegia (excluding the rarer varieties associated with trauma, tumour-growth, etc.) it has long been customary to classify cases as being the result of (1) hæmorrhage, (2) thrombosis, (3) embolism. No doubt, cases of hemiplegia of hysterical origin have also been described, but no one, I venture to think, could classify either of the above cases under this heading; none of the coincident hysterical features were exhibited by either case.

Is it possible, then, to explain such instances of transitory hemiplegia by one or other of these three pathological conditions generally described?

1. That the attacks in P. Q. and A. Z. were produced by *hæmorrhage* can scarcely, I think, be maintained; such a rapid and perfect recovery (repeatedly in Case I.) could not possibly occur if a blood clot, however small, had lacerated or compressed a portion of the cerebral motor tract. Recovery which is wonderfully perfect undoubtedly occurs occasionally in cases of hemiplegia from cerebral hæmorrhage, but such a recovery is always gradual, a matter of days or weeks rather than minutes.

2. *Thrombosis* (arterial) is equally improbable as an explanation; for, although hemiplegia of thrombotic origin is occasionally described as being sudden in *onset*, the instantaneous character of the *recovery* in the above cases is entirely opposed to such a hypothesis. Removal of a thrombus, even in the most favourable (syphilitic) cases, is never a matter of minutes.

3. Would *embolism*, then, explain such cases? The suddenness of the onset without loss of consciousness in the above cases is, undoubtedly, in keeping with the usual clinical history of cases of hemiplegia due to cerebral embolism. But what of the equally sudden and perfect *recovery*? This could only result from (*a*) absorption of the occluding particles, (*b*) their displacement or disintegration, or (*c*) restoration of the occluded blood supply by anastomosis.

(*a*) Now, is it conceivable that complete absorption of an embolus could occur (*repeatedly* in the case of P. Q.) in such a manner as to permit of such an early and instantaneous recovery as is manifested in the above cases? Our experience of the absorption of emboli in other occluded arteries (*e.g.* in the limbs) teaches us that the process is unfortunately a very tedious one.

(*b*) Similarly dislodgment or disintegration of the embolus could scarcely lead to sudden and perfect recovery, though it might produce an alteration of the symptoms. It is most improbable that the disintegrated fragments (in each one of P. Q.'s repeated attacks) could be whirled away from the primary site of blocking without producing further signs of embolic occlusion elsewhere.

(*c*) Restoration of the occluded blood supply by anastomosis seems equally unsatisfactory as an explanation; such a method of restoring function is always a gradual and not a sudden process. Moreover, if any one of these methods of recovery is really the explanation of such transient attacks as those recorded in this paper, how is it that cases of embolic hemiplegia are so often more or less permanent?

Surely there is another and more feasible explanation of such an attack, viz. a local spasm of the arterial wall producing temporary occlusion of the blood supply of a certain cerebral area. Granting for the moment the possibility of such a vascular condition, let us see if this hypothesis would explain the characteristic features of the cases described. The *suddenness* of the recovery, and especially its *perfectly complete* character, can be fully accounted for; because so soon as the vascular spasm relaxes, complete restoration of motor power is possible, no organic damage to the vessel wall or the surrounding nervous tissues having resulted. Similarly *recurrence* of this

temporary local arterial spasm (as in P. Q.) is possible without any permanent damage resulting. It is merely as if steam were to be shut off temporarily from a certain portion of the machinery of a large workshop, causing thereby cessation of work in the affected part of the factory. The wheels will, nevertheless, begin to revolve as perfectly as before, the instant the "occlusion" of the steam is removed. Temporary occlusion, then, of the blood supply, due to arterial spasm, would seem to account adequately for the characteristic features of the cases recorded above.

Now, is there ground for believing that such temporary spasmodic local constriction of arterial walls does occur in the cerebral vessels? Without presuming to enter into the question of either the physics or the pathology of the cerebral vascular supply, one may allude to the vasomotor theory of the causation of "megrim" which has gained a fairly wide acceptance, and it is certainly of interest to note that in this latter affection the occurrence of transient aphasia has been noted.

In a recent number of the *Practitioner*, under the title of "Cerebral Manifestations of Hypertonus in Sclerosed Arteries," Dr William Russell seeks to emphasise the existence of a variety of transitory paralysis of cerebral origin which is due to "spasm contraction" of sclerosed cerebral vessels. Of such a condition—or one closely allied,—I venture to think the above cases are well-marked instances. Dr Russell in his article lays stress upon the importance of a proper recognition of the state of the vessel wall, apart from the blood pressure. In the absence of precise information in my notes of these cases regarding those two points, I hesitate to declare they had either hypertonus or sclerosis; but the treatment adopted in each case was certainly based on the existence in each of a "gouty" condition, calling for a lowering of their full-blooded state. I would add, also, that in the case of P. Q., who had repeated transitory hemiplegic seizures, treatment with the usual nitrite vaso-dilators, both in the intervals and when the onsets threatened, appeared to act beneficially.

Another paper of very great interest in reference to the subject of arterial spasm was recently read by Dr R. A. Lundie at the Edinburgh Medico-Chirurgical Society, and will doubtless appear in its *Transactions*. In this he describes a case which

he had observed of temporary blindness of one eye due to spasm of a branch of the retinal artery. Ophthalmoscopic examination revealed a contraction in the calibre of a portion of the artery, which was observed to pass off, the vision gradually returning. This would seem to be almost an exact parallel to the type of hemiplegia recorded above. Just as the affected portion of the retina in Dr Lundie's case ceased to perform its functions when its supply of "life blood" was temporarily cut off, so, I would suggest, did the cerebral motor area in the two cases detailed above cease temporarily to perform its work (owing to occlusion of its blood supply), leading thereby to the occurrence of a hemiplegic seizure. The parallel is not quite exact, for, so far as I can learn (the case not being yet published, to my knowledge), the recovery in Dr Lundie's retinal case, though perfect, was not *sudden* as in my cases of hemiplegia; but if the *onset* of arterial spasm can be sudden (as it apparently was in Dr Lundie's case), it is surely conceivable—and also probable—that the relaxation might be equally rapid.

The points, then, I would venture to put forward, may be summarised as follows:—

1. That an individual may have a sudden attack of hemiplegia (involving the leg, arm, and speech) without loss of consciousness, exactly resembling an ordinary "paralytic shock," and yet recover completely in a few minutes.

2. That in view of this possibility one should be cautious, when called suddenly to a case of "paralytic shock" in which consciousness is retained, as to giving a prognosis or an exact diagnosis of the nature of the seizure.

3. That the characteristic features of such an attack would seem to be best explained on the hypothesis of the existence in such patients of a temporary arterial spasm, involving a portion of the central vascular supply.

4. That in all probability this arterial spasm will be found to be associated with the condition of hypertonus in sclerosed arteries described by Dr William Russell.

5. That since marked benefit may be expected to accrue from prophylactic treatment—dietetic and medicinal—directed towards the removal of those conditions which predispose to (or maintain) arterial contraction, the prognosis in such cases, both immediate and as regards recurrence, is distinctly good.

THE DIAGNOSTIC VALUE OF RADIOGRAPHY IN FRACTURES

Paper read before Forfarshire Medical Association

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Surgeon, Dundee Royal Infirmary

I HAVE ventured to direct your attention to this subject, because I believe it is one which might become of real practical interest to any one of us at any moment in our daily practice. It falls to the lot of most physicians even to have to set a fracture now and then; but it is only since the introduction of Radiography that it has become possible for others to prove beyond a shadow of doubt whether the work has been well or ill done, and that, too, years afterwards. We must, therefore, be ever prepared to defend our work, and to show that we have done the best possible for our patient under the circumstances, and to do this we should all be able to read fairly accurately any radiogram, provided always that sufficient details regarding the taking of it be given us.

A radiogram differs from every other picture in photography. It is not a shadow or skiagram, but a series of superimposed pictures of planes of the object, each plane being parallel to the sensitive plate and leaving its own picture on it, while being more or less transparent to the rays producing the pictures of the other planes. I have said more or less transparent, for the density of the components of the planes affect their transparency.

I shall try to represent diagrammatically what happens when we radiograph a limb; but first I shall explain briefly the source of the rays, *i.e.* the focus tube. We speak of one end as the anode, and the other as the cathode, but you must remember that in most installations the electrical current passing through the tube is alternating, a stronger current passing from anode to cathode at the break of the primary, and a weaker current from the cathode to the anode and anticathode at the make. Both of these currents in passing through the tube produce X-rays in this way. The current passing from anode to cathode produces at the cathode cathodal rays, which are converted into X-rays by any solid body on which they impinge.

This solid body in a focus-tube is called the anticathode, and a concave disc on the cathode focuses the cathodal-rays on the anticathode, and they pass off as X-rays in all directions in front of the plane of the anticathode; but the best rays are those at right angles to the cathodal rays. If these X-rays strike any body which they can cause to fluoresce, secondary X-rays are produced, and this takes place as they pass through the glass walls of the tube. But all the rays from the cathode are not focussed on the anticathode, and when these strike the glass walls they produce X-rays, which may fly off in any direction. Also, X-rays are produced when the cathode becomes anode, and all these adventitious rays play havoc with the sharpness of the outline of our picture. We must recollect, too, regarding X-rays, that they do not behave like light rays, but travel in straight lines, and are not reflected, refracted, or diffracted by any object with which they may come in contact.

A ray (Fig. i.) coming from the centre of the anticathode and entering the bone in the limb at *e* emerges at *h* and strikes the plate at *a*, so that the picture at *a* is made up of shadows of the bone between *e* and *h* + the shadows of soft parts between *s* and s^1. But note, these points are not in the perpendicular from *e* to the plate, so that the shadow of *e* is thrown further out on the plate than the shadow of *g* perpendicularly below it, *i.e.* nearer to the plate, which would be at *c*.

If, again, the bone were broken between *e* and *g*, and there were some separation (see Fig. ii.), it is evident that the rays from the anticathode through *n* and n^1 would diverge further before reaching the plate, and the shadows of *n* and n^1 would, as represented by $l\,l^1$, show a greater separation than was really there, and this increases the nearer the tube is to the plate.

Again (in Fig. iii.), there might be a displacement which, because the same rays passed through, would not show even a fracture, for the picture shows nothing but differences of density of parts traversed by the rays.

To take an example. Here I have two radiograms of the same arm—a Colles' fracture—taken at the same time, with arm and plate in exactly the same relative position. But in the first a ray passing from the anticathode to the plate

through the fracture made an angle of 45° with the plate. Note the effect. The hand segment (Plate IV., Fig. 1), which was

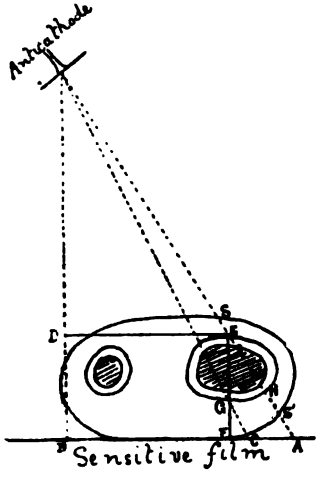


Fig I

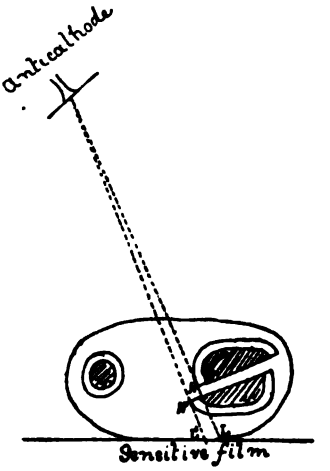


Fig II

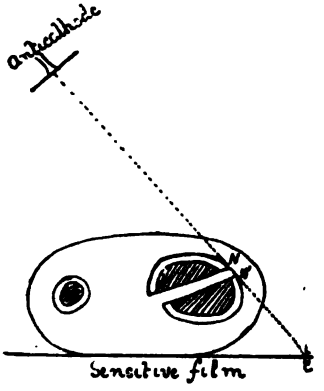


Fig III

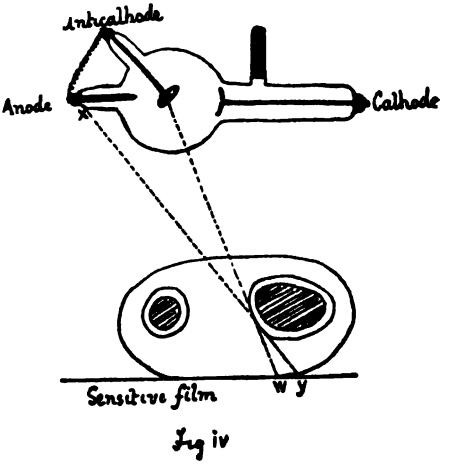


Fig iv

farthest from the plate, is shown in shadow as displaced radially, and a distinct fracture is thus made apparent. In the second picture (Plate IV., Fig. 2), the only thing out of place is the

styloid process, and no other evidence of a fracture is seen. The position for the tube was first ascertained by the fluorescent screen.

A Colles' deformity is, as you know, typical, but that did not prevent a medical friend of mine from diagnosing this next (Plate IV., Fig. 3) as a dislocation, and he would have remained unconvinced but for the overlapping of the fragments seen in the radiogram. You notice, again, the typical displacement of the styloid process.

If all the X-rays came from the centre of the anticathode, then *a b* would always be larger than *e d* (Fig. i.), and the picture would be something like an enlarged flat reproduction of the object, but we have to consider the adventitious and secondary rays I have spoken of. These may come from anywhere in the walls of the tube. If you wish to see them for yourselves, place a fluorescent screen behind the plane of the anticathode, and look at your hand. The outline is dim, but it is there. These rays get at the sensitive plate and blur the picture. Such a ray is *x y* (in Fig. iv.), which, getting at the plate, affects the part *y w*, and spoils the sharpness of outline. Note the effect of such rays (in Plate IV., Fig. 1), where the ulnar edge of the separated epiphysis is thinned out so as to be almost invisible, and broadened also by such rays. The object often seems as if it had been moved.

I show you next a radiogram of the patient's leg you have just examined. The fracture occurred four months ago, and was put up in Plaster of Paris at the time. There seems (in Plate V., Fig. 1) to be about ¾ in. of shortening and considerable overlapping of the fragments. But neither are actually so great as this picture makes them out to be. Did you suspect such a deformity when you examined the leg for yourselves?

If I tell you that the rays through the fracture made an angle of 60° with the plate, and that the picture was taken to determine the solidity of the new bone formation, you will see that my object in taking the radiogram was attained. A second picture of the same limb showed the almost complete uselessness of a picture taken anyhow. It showed nothing that was not known before, and yet it was taken as an ordinary mechanic would take it, viz. with the back of the leg on the plate, and the foot slightly rotated outwards.

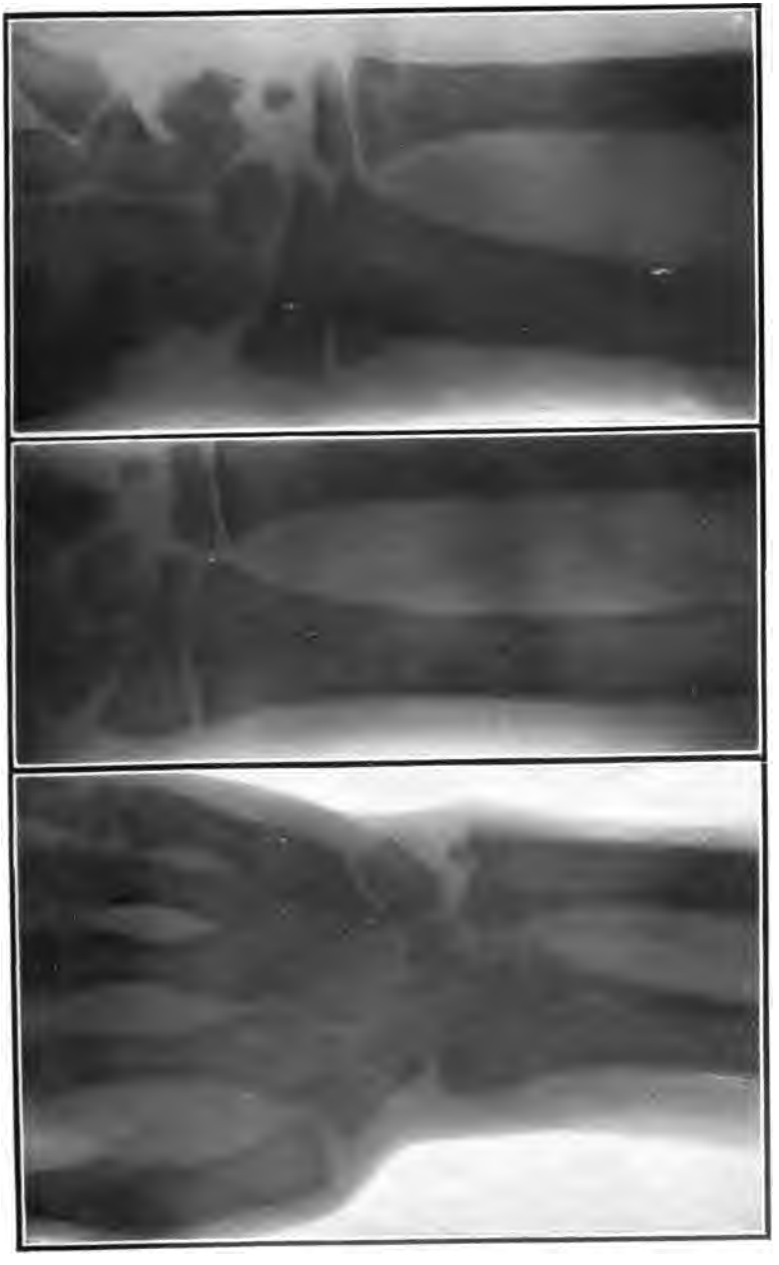


FIG. 3.

FIG. 2.

FIG. 1.

PLATE IV.—TO ILLUSTRATE DR DON'S PAPER.

The next three negatives I show you were taken from the arm of the girl you have seen to-night. It is a bad fracture of both forearm bones, and even yet, after seven weeks, union is weak. [1] Radiograms v. and vi. were taken before the arm was put up in splints, and both show the arm and plate in the same relative position. The radius, you see, is a simple, the ulna a comminuted fracture. In v. the anticathode was perpendicular to the lesion; in vi. the rays through the fracture made an angle of 45° with the plate. Both show bad apposition, but while we should unhesitatingly condemn a setting such as vi. shows as bad surgery, the same could not be said of v., where the comminution of the ulna might excuse a not very accurate apposition. Radiogram vii. shows the arm in splints. You might now hesitate to say that the radius had been broken, and the detached splinter of the ulna only makes the setting seem the more accurate.

Blood clot and blood extravasation may make the outlines of bones indistinct, for it is density only that tells in the picture. I show you their effect in the radiogram of this shoulder (Plate VI., Fig. 1). The patient was a big, fat, muscular man, as you can see from the fleshy outlines. There was inward displacement of the head of the humerus of ½ in., and crepitus could be elicited on movement of the arm upward and forward, which was also very painful. The radiogram was taken with the anticathode over the nipple line, and 20 inches from the plate, and this should have given a clear space between the head of the humerus and the glenoid cavity. But owing to the density of the soft parts and blood, you will notice that all the bones at the joint and the scapula are more or less obscured, though the rest of the plate is fairly distinct, and there is no sign of a fracture. You will better appreciate the obscuring effect of muscle and blood if you look at this picture (Rad. ix.), where the outline of the spine, though nearest the plate, is completely obscured by the shadow of the dilated heart.

Fractures in or near joints are very difficult to represent well in radiogram, and more than one plate may have to be taken. The muscles about the shoulder and hip joints in muscular men are sufficient to obscure almost completely a bony lesion, and to this is often added the overlapping of the bones

[1] Radiograms v., vi., vii., ix., x., and xi., etc., have not been reproduced.

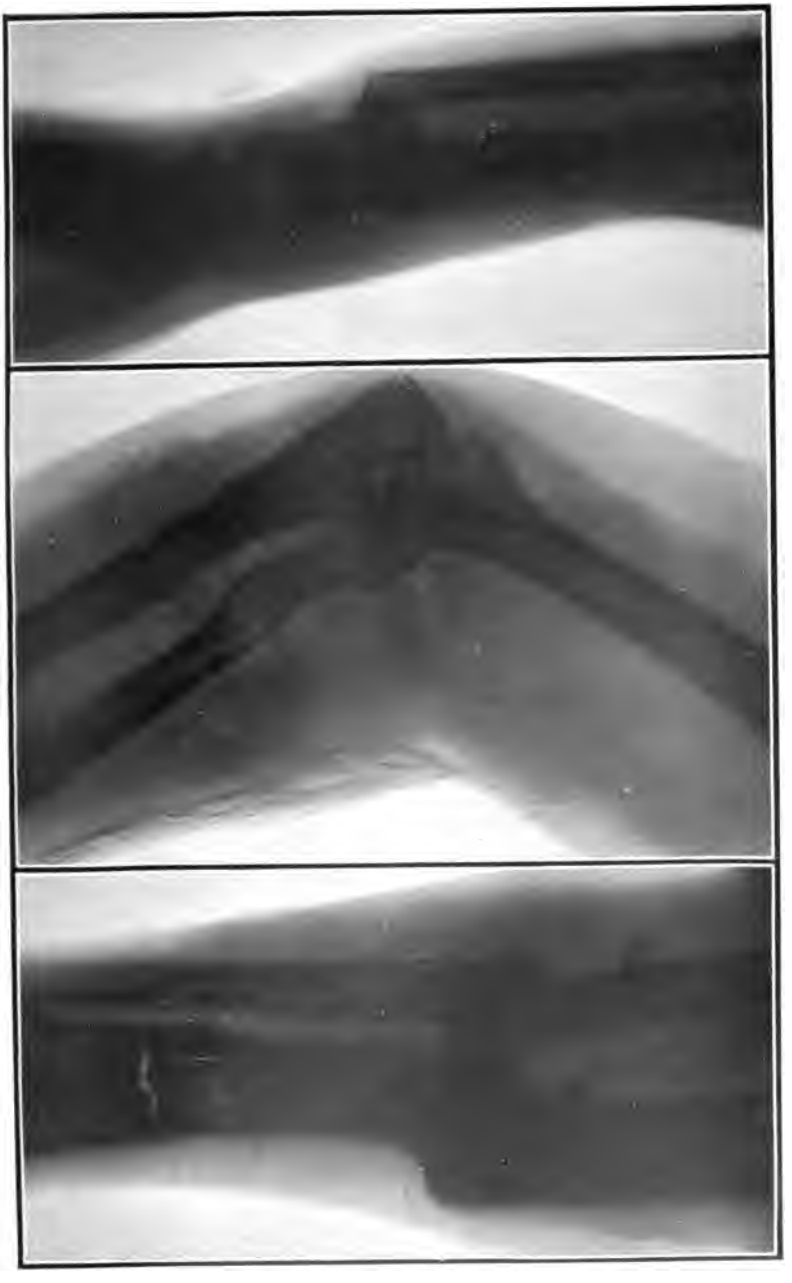
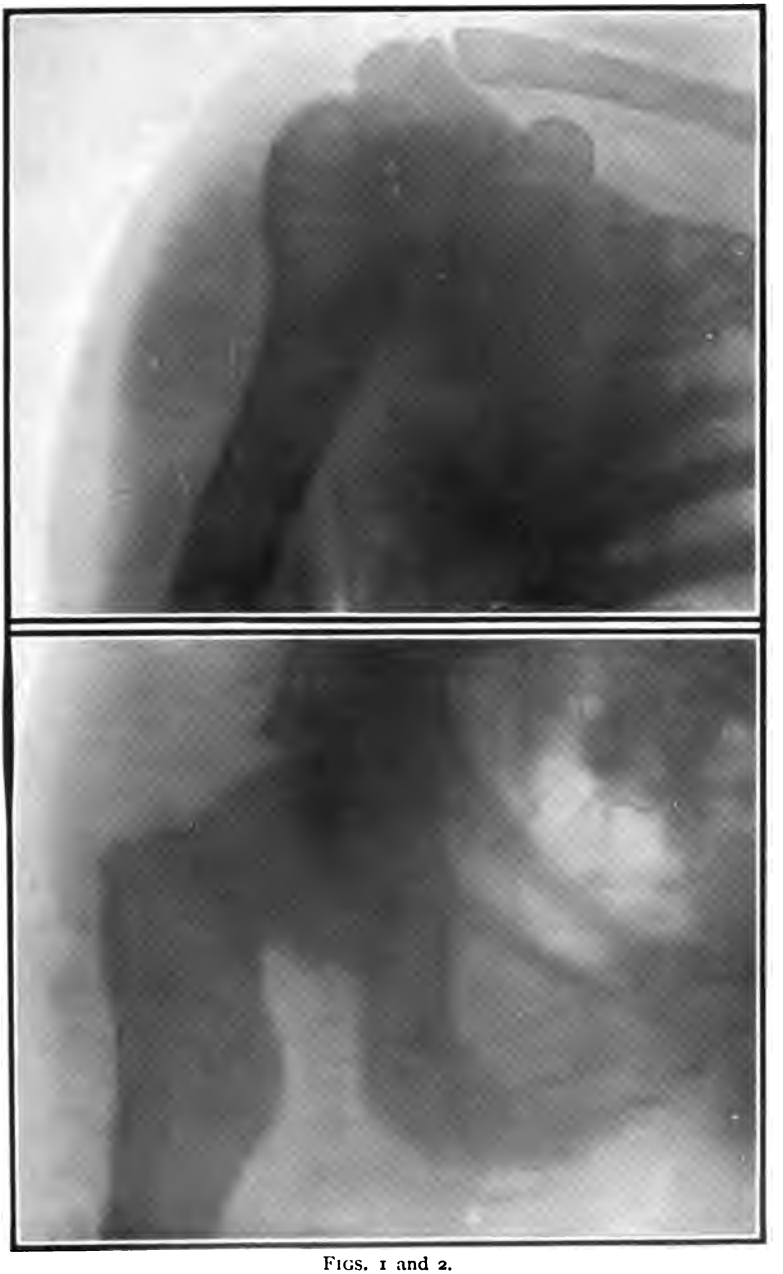


FIG. 3.

FIG. 2.

FIG. 1.

PLATE V.—TO ILLUSTRATE DR DON'S PAPER.



FIGS. 1 and 2.

PLATE VI.—TO ILLUSTRATE DR DON'S PAPER.

It is therefore to the obstetrician that we must turn for help, as it is he alone who can recognise the condition at a time when treatment is most likely to be efficacious.

Before, however, considering the treatment, one inquires first into the conditions in the mother and child which are most liable to predispose to these intracranial hæmorrhages.

I had the opportunity some time ago of witnessing a case, the symptoms and signs of which impressed me greatly at the time, and which have been vividly brought to my mind again by a recent paper of Cushing's on the intracranial hæmorrhages of the new-born.

It was that of an elderly primipara, a strong, healthy woman, about thirty-nine years of age. The presentation was normal, vertex, of first position. The pelvic measurements were those of a justo-major pelvis.

As far as could be reckoned, however, the patient had gone beyond her time, and the fœtal head was large and well ossified.

The second stage was tedious, forceps being applied owing to the irregularity of the fœtal heart sounds. The child was born considerably asphyxiated. There was marked cyanosis, but the child was otherwise healthy, there being slight bruising over the parietal regions from the forceps. It recovered in about half an hour, but remained somewhat cyanosed for the first two days, after which it apparently recovered. On the fifth day it had a convulsion, commencing, as far as could be made out from the nurse, in the right lower limb, but rapidly becoming general. On the sixth day it was seized with a series of convulsions lasting for two or three hours, and on the seventh day a further series of fits, lasting intermittently for about four hours, led to its death at the end of that time.

On looking back upon this case, I cannot help thinking that there had been a considerable meningeal hæmorrhage. The fontanelle was bulging and the eyes somewhat prominent, the child always having a somewhat dusky cyanotic appearance.

According to Gowers the presentation in about one-fifth of the cases is unnatural, the head being born last, but the same symptoms follow head presentations. Half the cases are first-born children, and in other cases the labour has usually been difficult. Although in many cases forceps are used, the lesion

cannot be looked upon as caused by the use of the instrument, but rather from the conditions that make it necessary. Gowers records one case in which the clumsy use of the forceps indented the skull over the arm centre of the opposite limb, which was chiefly affected, but he draws attention to the fact that the lesion is not as a rule due to instrumental aid, a point that should be noted to safeguard against reflections being cast upon the obstetrician.

Some cases appear also to occur as the result of precipitate labour, from the rapid birth of a soft and easily compressible skull.

The affection is somewhat more common in boys than in girls.

Through the kindness of the physicians of the Children's Hospital, I have been able to examine some of the records of cases under their charge, as well as those appearing in the Surgical Out-patient Department.

Of fourteen cases of cerebral palsy of evident traumatic origin, at least where a history of dystocia was present, ten occurred in males, ten were first-born children. As far as could be made out from the history, the presentation was vertex in eleven cases, breech in one, and transverse in two cases.

In all the cases except two, the labour was described as long and tedious, in one case extending over four days, instruments being used in four cases, while in three cases no doctor was present, the patients being attended by a midwife.

Two of the children were born prematurely, but in both there was marked asphyxia, the children being described as "quite black" and "purple."

Distinct injury to the head was only noticed in one case, while marked cyanosis was present in eight of the cases, and lasted for a varying time from a few hours to several days.

In ten of the cases the resulting paralysis was a diplegia, with in one case almost complete idiocy. These then present the worst class of cases that are met with in Hospital or private practice, but there are many others of milder form seen from time to time in an Out-patient Department.

It would appear therefore that the conditions which most

favour these intracranial hæmorrhages are those in the mother giving rise to tedious labour not necessarily requiring instrumental interference. Prolonged cranial compression probably in many cases is a common cause, but the most frequent exciting cause is asphyxia. In the child the presentation which shows the greatest number of cases of hæmorrhage is the vertex, although it seems probable that its relative frequency is more common in breech or transverse cases.

Upon this point, however, there is very little record, and until systematic examination of the skull is made in fœtuses which have died during parturition, our knowledge of the situation of these hæmorrhages and their causation must remain very insufficient, and I hope, in bringing forward this subject to-night, that those who have access to extensive hospital and private obstetric practice may be led to investigate the cause of death more frequently in fœtuses which are still-born.

It is important, therefore, to consider the symptoms which betray a hæmorrhage, in those cases which survive parturition.

First there is the history of a protracted or difficult labour. When born the child presents more or less marked signs of asphyxia ; owing to the general condition of the child, paralytic symptoms are often not noticed at first. In most cases nothing is noticed in the condition of the child during the first few days of life, but in a few there is evident difficulty in swallowing. One arm or leg is not moved ; sometimes none of the limbs are moved ; but this attracts less attention than a one-sided immobility. Another frequent symptom is convulsion, general or unilateral, and often accompanied by persistent rigidity of the limbs and inversion of the thumbs. The convulsions, when not fatal, usually cease a week or two after birth.

A most important sign is a bulging of the anterior fontanelle, which is often firm and non-pulsating. Œdema of the eyelids and proptosis is recorded in one of Cushing's cases (Case 3), while subconjunctival and palpebral hæmorrhages denoted the possibility of accompanying sinus thrombosis. In this case, blood-clots were removed from both cerebral hemispheres, the child recovering completely from the operation.

The hæmorrhage in these cases is usually of venous origin, arising from the small veins of the cerebral cortex which run

into the superior longitudinal sinus. If one examines these vessels anatomically, one finds that they run from the sulci across the interval of the superior longitudinal fissure, and open into the sinus in a direction against the blood stream. Cushing believes that they are apt to burst from backward pressure where they are least supported, namely in the fissure.

I have examined in two post-mortem subjects recently the veins opening into the sinus. Many small veins enter at numerous points from its origin at the glabella, to its termination at the torcular Herophyli, but there are two or three vessels of larger size which pass from the region of the Rolandic area to the sinus, from the rupture of which considerable extravasation would take place.

Clinical symptoms support the anatomical arrangement as to the probable source of these hæmorrhages, and when one considers the degree of overriding of the parietal bones especially, and the general moulding of the skull which takes place during labour, there must, even under normal circumstances, be considerable interference with the blood flow through the sinus and its feeding vessels.

Cushing believes that rupture of these vessels is most frequent on one side, but most neurologists seem to agree that diplegia is the most common form of traumatic cerebral palsy.

What then is to be the line of treatment in cases presenting such symptoms.

Whenever there is the least doubt, it is advisable to perform lumbar puncture as recommended by Cushing, who points out that in the adult meningeal hæmorrhage in the brain can often be detected by the presence of blood in the cerebral-spinal fluid removed by such means.

Cushing has operated on four cases which presented characteristic symptoms, in all of which extensive subdural hæmorrhages were present, and where the general condition of the child was critical.

Two of these recovered from the operation, and immediately began to improve. The more remote results are obviously difficult to estimate.

The operation consists in an osteoplastic resection of the skull to expose a large portion of one or both cerebral

hemispheres, the washing away of all extravasated blood from the cerebral cortex, and the replacement of the osseous and soft tissues flap.

Children bear operations on the skull relatively extremely well as compared with the adult, the operation itself taking a much shorter period of time, and being associated with comparatively little shock, which might be expected when one considers the amount of traumatism every child is exposed to during labour.

Provided every care is taken to prevent loss of blood, therefore the risk of such an operation itself is not nearly so great as might be at first anticipated.

In conclusion, gentlemen, the points which I should like to lay stress upon in considering this subject are—

1. The importance of examining the skull and its contents in all dead-born children, and in those which die shortly after birth with symptoms of asphyxia.

2. Asphyxia is more commonly the exciting cause of hæmorrhage, injury from application of forceps forming a very poor second as regards its etiology.

3. The advisability of lumbar puncture in all cases of severe asphyxia, especially if associated with increased intracranial pressure, as evidenced by a bulging anterior fontanelle.

4. The importance of early operation in all cases where symptoms persist for a few days, especially when fits and signs of focal pressure are present.

Since this paper was read an examination of the skulls and cranial contents in six fœtuses and young infants has afforded me the opportunity of investigating more particularly the anatomical conditions bearing on this subject.

The superior longitudinal sinus from its origin at the ethmoid bone to the torcular Herophyli receives from 10-12 veins, from the superior cerebral surface, on each side. A number varying from 4-6 of these are large in size. With one or two exceptions these larger vessels enter the sinus under cover of the parietal bone, but more especially at its anterior and posterior border close to the coronal and lamb-

doidal sutures. They are usually larger in the region of the coronal suture.

The presence of these large vessels close to these cranial sutures suggests the possibility of their injury in the displacement and overlapping of the cranial bones during parturition.

According to Cunningham and Horsley, the fissure of Rolando and Rolandic areas are situated nearer to the coronal suture in intra-uterine and early extra-uterine life than in later life, so that any lesion of these vessels will rapidly affect these areas.

Another factor which may have a possible bearing on the ætiology of these hæmorrhages was shown in two of the skulls examined.

In one, a somewhat hydrocephalic skull, the superior longitudinal sinus was not situated mesially, but from the anterior aspect of the anterior fontanelle passed under the right parietal bone about one-eighth of an inch from the sagittal suture, so that the superior cerebral veins of the left side crossed the suture unsupported in order to reach the sinus. Any over-riding of the one parietal bone upon the other would seem to nip the vessels as they crossed the sagittal suture.

This condition was also shown to a lesser extent in another skull.

The anatomical arrangement of the superior cerebral veins and their relationship to the superior longitudinal sinus and the coronal and sagittal sutures seems to favour their injury not only from cranial compression, but also from increased intracranial venous pressure in asphyxia.

Clinical Record

CLINICAL NOTES OF TWO CASES OF VESICULAR MOLE

By ROBERT JARDINE, M.D.,

Professor of Midwifery in St Mungo's College ; Senior Physician to the Glasgow Maternity Hospital

DURING the months of March and April of this year I have had an exceptionally large number of cases of hæmorrhage during pregnancy under my care, and, as some of the cases were of great interest, I shall give notes of them. The first two were instances of that interesting condition, vesicular degeneration of the chorionic villi.

CASE I. Mrs M'C., æt. 27, v-para, six months pregnant, was admitted to Hospital on March 2nd, suffering from hæmorrhage.

The patient stated that her previous pregnancies and labours had been normal, and that her last child was a year old. She had last menstruated in October. About the middle of January, while going about her work, she had suddenly begun to bleed, and had lost a considerable amount of blood. The bleeding had recurred every few days since, and latterly had become more profuse in amount. The bleeding had been accompanied with a moderate amount of pain.

She was somewhat anæmic looking, but not in correspondence with great loss of blood. Her heart and lungs were normal. The uterus felt somewhat soft and doughy, and to the left side there was a distinct bulging of a somewhat firmer consistence. The fundus was not quite up to the umbilicus. The uterus was therefore not any larger than it should have been for the time of pregnancy. No crackling sensation could be detected. No fœtal heart could be heard, nor could any fœtal parts be made out. The cervix was soft and the external os patulous, but the internal os would not admit the tip of the finger. There was some dark bloody discharge.

The patient was kept in bed, and until the 8th there was practically no discharge. She then began to have pains, and when the os would admit the finger a mole was felt. The greater part of the mass was expelled. There was no trace of the fœtus, but part of the placenta had not degenerated. There were several old whitish clots about the size of the palm of the

hand. The uterine cavity was thoroughly cleared with the fingers and douched out. The uterus retracted well, and there was very little bleeding.

The patient made a good recovery. She reported herself a month after dismissal, and was then in good health.

CASE II. Mrs C., xiv-para, æt. 45, was admitted to Hospital on April 20th, suffering from hæmorrhage.

The patient stated that her last child had been born five years before, and that she had had one still-born child and one miscarriage. Menstruation had ceased three months before the New Year, and she had been troubled with morning sickness. About the New Year she had begun to have pains and lose blood, and had passed lumps. The pains had been severe, like labour pains. She had bled more or less nearly every day since. She had felt a dull pain across the bottom of her belly at times, and this had been worse during the last few days. She had been advised to come into Hospital some weeks ago, but had disregarded the advice.

On the day after admission I examined her under chloroform. The uterus was soft and regular to the feel. No fœtal parts could be felt, nor any crackling sensation. The fundus was two-thirds up to the umbilicus, so the uterus was really smaller than the time of pregnancy should have shown. There was no fœtal heart to be heard. The external os admitted the tip of the finger, but the cervical canal was not dilated. The canal was dilated with Hegar's dilators sufficiently to introduce a finger. The cervix was very rigid. The edge of degenerated placenta was easily felt attached low down at the internal os. Some vesicles were washed out with the douche. We had thus to deal with a vesicular mole in a case of placenta prævia.

As the cervix was extremely rigid, and was showing indications of tearing, I decided not to attempt further forcible dilatation, but to plug and wait. The cervix and vagina were therefore carefully packed with iodoform gauze. There was some oozing of blood after the packing, and ergot was given. The packing was changed nine hours later and the os was a little dilated. Labour pains began on the following day, and the second packing was removed twenty-two hours after it had been put in. The cervix was now taken up, but the os had not dilated very much. It was dilated with the fingers and the uterine contents were cleared out. The lower part of the uterus felt quite thick, and there was no indication of the vesicles having penetrated any part of the wall. The uterus retracted well and there was no post-partum hæmorrhage. The cervix had torn towards the left side and two catgut stitches were inserted.

The placenta was not entirely vesicular. There was no trace of a fœtus.

The patient made a good recovery. Iron and arsenic were given for the anæmia. She was advised to report herself within a month of dismissal, and to come back at once if there was any discharge.

In text-books it is usually stated that one of the cardinal indications of a vesicular mole is that there is a very rapid increase in the size of the uterus after the third month, and that it is always larger than it should be for the time of pregnancy. In neither of these cases was this so, and, in fact, in the second the uterus was really smaller than it should have been. The passage of vesicles is also given as a diagnostic sign, but neither of these patients had ever noticed any, and none were seen by us. I have never seen a case in which vesicles were noticed in the discharge until the uterus was actually emptying itself. If vesicles are seen or felt by the finger the diagnosis is easy. In the first case we were not sure of the condition until the os began to dilate, and in the second we only made a definite diagnosis by dilating sufficiently to get a finger in.

There is a condition which very closely resembles a hydatid mole, and that is what may be termed concealed accidental hæmorrhage in the early months of pregnancy. The uterus is enlarged and doughy to the feel, and no fœtal parts can be felt or fœtal heart heard. I have published notes of several such cases.

The treatment is to get the uterus emptied as soon as the condition is recognised. Forcible dilatation should not be resorted to, beyond what is necessary to make sure of one's diagnosis. Tents may be used, but I prefer packing. In Case II. there was slight laceration of the cervix when the os was dilated with the fingers. The uterus should be cleared with the fingers, and not with a curette, as the risk of perforation is considerable.

In every case the patient should be kept under observation for some time, for fear of the development of deciduoma malignum.

Births and Deaths registered in Eight of the Principal Towns of Scotland during April 1906.

DURING the month of April 1906 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth, the births of 4388 living children; of whom 2220 were males, and 2168 females. These births are 131 more than those registered in March, and 217 more than those registered in April 1905. The births are equivalent to an annual rate of 29.9 per thousand of the estimated population, a rate which is 1.8 more than that for March, and 0.9 more than that for the corresponding month of last year. The birth-rate for the month was highest in Greenock, 34.4, and lowest in Perth, 20.1. In Glasgow the rate was 32.8; in Leith, 31.4; in Dundee, 30.3; in Aberdeen, 29.4; in Paisley, 28.2; and in Edinburgh, 23.0.

Of the total births, 283, or 6.4 per cent., were illegitimate. The rate of illegitimacy was highest in Perth, 14.0, and lowest in Paisley, 2.5. In Aberdeen it was 9.4; in Edinburgh, 7.8; in Glasgow and Dundee, 6.1; in Leith, 5.6; and in Greenock, 3.0.

The deaths of 2745 persons were registered in these towns during the month, of whom 1363 were males and 1382 females. The number of deaths is 67 less than that for March, but 299 more than that for April 1905. These deaths represent an annual death-rate of 18.7 per thousand of the estimated population, this rate being 0.2 above that for March, and 1.7 above that for April of last year. The death-rate for the month was highest in Greenock, 22.0, and lowest in Aberdeen, 14.2. In Dundee it was 19.7; in Edinburgh, 19.3; in Glasgow, 19.2; in Paisley, 18.0; in Leith, 17.2; and in Perth, 15.5. In Edinburgh, Leith, and Greenock the death-rate is greater than in March; in the other towns it is less than in that month.

Of the 2745 deaths, 875, or 31.9 per cent., were of children under five years of age; and 752, or 27.4 per cent., were of persons aged sixty years and upwards. The former are 33 less than in March, and 34 less than in April 1905; the latter are 39 more than in March, and 147 more than in April of last year.

The deaths were recorded of 508 children under one year old. This number is 24 less than that for March, and 4 less than that for April of last year. The infantile mortality was at the rate of 125 per thousand births. The highest rate was in Dundee, 153, and the lowest in Paisley, 103. In Greenock it was 148; in Edinburgh, 130; in Glasgow, 123; in Leith, 116; in Aberdeen, 114; and in Perth, 104. In Glasgow, Dundee,

and Paisley the infantile mortality rate was lower than in the previous month, but was higher in the other five towns.

From the principal epidemic diseases 210 deaths were registered, being 33 fewer than the number in the previous month, and 29 fewer than the number in the corresponding month of last year. The equivalent annual death-rate from these causes was 1.4 per thousand. The rate ranged from 2.2 in Leith to 0.4 in Aberdeen; it was 1.9 in Dundee, 1.6 in Glasgow, 1.5 in Edinburgh, 1.3 in Paisley, and 0.7 in Greenock and Perth.

No deaths from smallpox occurred in any of these towns during the month. Measles caused 83 deaths, which is 30 fewer than in March, but 8 more than in April of last year. Deaths from scarlet fever numbered 7, and were 10 fewer than in March, but one more than in April 1905. Deaths from whooping-cough numbered 67, being 17 more than in the previous month, but 48 fewer than in the corresponding month of last year. Diphtheria caused 22 deaths; these are 7 fewer than in March, but 3 more than in April 1905. Six deaths were due to enteric fever; this number is 4 less than that for March, and 2 less than that for April of last year. Deaths from diarrhœal diseases numbered 25; these are 2 more than in March, and 11 more than in April 1905.

Deaths from puerperal septic conditions numbered 10; from malignant disease, 140, of which 73 were ascribed to carcinoma, 4 to sarcoma, and 63 to cancer not otherwise defined. From diseases of the heart, 258 deaths were registered; from apoplexies, 139; from premature birth debility, 91; and from alcoholism, 7.

Deaths from pneumonia numbered 362, and constituted 13.2 per cent. of the total mortality; while those from bronchitis numbered 237, and constituted 8.6 per cent. of the total mortality. The deaths from pneumonia are 64 more than in March, and 94 more than in April of last year; those from bronchitis are 16 less than in March, but 43 more than in April 1905.

Deaths from tuberculous diseases numbered 355, and constituted 12.9 per cent. of the total; these deaths are 34 less than in March, but 18 more than in April of last year.

To violent causes 116 deaths were ascribed; of which 13 were suicidal, 6 being by hanging, 5 by cut-throat, 1 by shooting, and 1 on the railway.

Of the persons whose deaths were registered during the month, 3 males and 7 females were aged ninety years and upwards. The oldest of these was a widow aged 93.

Meetings of Societies

Edinburgh Medico-Chirurgical Society

THE seventh ordinary meeting was held on May 2—Professor Greenfield, Vice-President, in the chair.

Professor Ehrlich was elected an Honorary Member of the Society.

Mr J. M. Cotterill showed a large hydro-nephrotic kidney and a hydatid cyst from the liver.

Mr Alexis Thomson exhibited a patient, a man aged 60, who had apparently recovered from chronic jaundice and distended gall-bladder after cholecyst-enterostomy.

Mr Cotterill showed a patient suffering from aneurismal varix of the orbit following an injury in the region of the left occipital lobe. There were indications of anastomosis with facial vessels, so that if operation became necessary, ligature of the common carotid would probably be the best course. Mr Cotterill also showed a patient after operation for injury to the internal semilunar cartilage.

Mr Alexis Thomson and Dr Woodward demonstrated the treatment of scoliosis by the system of exercises devised by Dr Klapp.

Mr L. C. Peel Ritchie demonstrated: (1) a portable rheostat for use with Kirstein's lamp for endoscopic examination with laryngeal autoscope, œsophagoscope, bronchoscope, urethroscope, etc., and for direct attachment to the cystoscope, etc., and a special mirror for lamp for demonstration purposes; (2) new ligature winders.

Dr W. Robertson read a paper on Infant Milk Depots in Leith. He referred to the fact that the dairyman finds it less trouble to add boric acid or formaline to milk than to have it chilled and suitably stored, and to the great difficulty in getting convictions against persons who sell defective milk. The establishment of an infants' milk depot was therefore a necessary expedient. Dr Robertson related some of his dealings with Leith dairymen which, however serious from a public health point of view, were not without a humorous aspect. The practical working of the depot was described and illustrated by lantern slides.

Dr Leslie Mackenzie said that the Leith Depot inaugurated by Dr Robertson had justified its existence and had an important educative effect.

Dr Aitchison Robertson deplored that at the present day

the public was obliged to take, and apparently did not object to take, milk as it was supplied by the dairyman. The municipal depot was a most useful expedient.

Dr Malcolm Campbell remarked on the great benefits which followed supervision and periodic weighing of infants fed by municipal or charitable institutions.

Dr E. Scott Carmichael read a paper on Inguinal Hernia in the Female, more especially in the child, which will appear in the *Journal*.

Mr Stiles discussed the question as to whether the majority of cases of hernia in children were congenital or acquired. In the male fœtus the processus vaginalis was not closed in about fifty per cent. of cases, but the common type of sac varied in length and thickness and communicated with the tunica vaginalis in only ten per cent. of cases.

In the female child, hernia probably started in a pouch or depression and was partly congenital, partly acquired.

In the female fœtus a well marked inguinal pouch lay at the foot of an inclined plane. The Fallopian tube and ovary lay just above the brim of the pelvis, and the fascia was very loose. The frequency of the uterine adnexa in the sac in children could be easily explained on these grounds, and it was unnecessary to consider any special action on the part of the round ligament.

Mr Miles remarked on the comparative rarity of the adnexa in adult female cases, and on the large proportion of adult female cases giving a history of trauma or occurring shortly after confinement.

A SPECIAL meeting of the Society was held in the Hall of the Royal College of Physicians on May 16th—Dr J. O. Affleck, President, in the chair.

Dr Walter G. Chase, of Boston, U.S.A., gave a demonstration of the Cinematograph in Medicine. A large number of films showing different stages of epileptic seizures, athetotic and choreic movements, the gait in various forms of paraplegia, and other pathological movements, such as nystagmus, were thrown upon the screen. Dr Chase claimed that the cinematograph presented an important aid to the study of the phases of pathological movement, and that it provided a means of keeping permanent records of rare cases. It also opened up a new area of possibilities as a means of demonstration. He pointed out that many students passed through their curricula without having seen an epileptic fit. The pictures might be made available for teaching not only by means of the cinemato-

graph itself, but also by much simpler mechanical means and by serial views in albums.

On the motion of the President of the Royal College of Physicians, seconded by Dr Gibson, a cordial vote of thanks was accorded to Dr Chase.

Edinburgh Obstetrical Society

THE sixth meeting of the 67th session was held on Wednesday evening, the 9th May—the President, Dr J. W. Ballantyne, in the chair.

Among the specimens exhibited were the following by Dr Haultain: (1) a 5½ months pregnant uterus with a large fibro-cellular tumour of the broad ligament, removed by pan-hysterectomy; (2) an interstitial fibro-cellular cervical tumour removed by pan-hysterectomy.

Dr Haultain also showed, for Dr Mackay of Berwick, a typical papyraceous fœtus.

Dr Haig Ferguson showed a uterus removed by vaginal hysterectomy for deciduoma malignum. Dr Ferguson also showed a coloured drawing of the specimen in its fresh condition. The clinical history of the case was of interest. The patient had had a hydatid mole removed from the uterus on February 28th. She had hæmorrhage from April 7th to 12th. A scraping was removed from the uterus for diagnostic purposes. This on examination showed the condition to be one of deciduoma malignum. A vaginal hysterectomy was performed; the patient made a good recovery from the operation, and up to the present exhibits no signs of any metastatic deposits.

Professor Jardine exhibited naked-eye and microscopic preparations from one of his cases, demonstrating extensive infarction of the kidneys.

Professor Jardine then read to the Society his "Notes on two Cases of Eclampsia."

The first case occurred in a multipara, who, on admission, had a pulse of 110, marked œdema, and headache. Prior to admission, there was a history of several fits. The urine became solid on boiling. Patient was bled, ℥xii being removed. A saline transfusion given. Stomach and rectum were washed out and the hot pack used. Two days after admission, patient was delivered of a 7 months fœtus. From admission to delivery patient had only 3 fits. After delivery only one. During the 12 hours immediately before delivery, patient passed ℥35 of urine. Immediately after delivery patient

had complete suppression of urine. Within two days of delivery there was marked jaundice. Cupping, hot packs, poulticing over the kidneys, etc., were tried without any effect on the suppression. Finally the capsule of one kidney was incised. The patient stood the operation well; the suppression, however, continued, and the patient died after 5½ days of complete suppression. Post-mortem, the liver was found to be large, pale, and fluctuating. On microscopic examination it was found to be the seat of fatty infiltration.

The kidneys were enlarged and congested. On section, there was found to be widespread infarction in the outer ⅓-⅔ of the cortex. The pelves and ureters were normal.

Microscopic examination showed widespread infarction, and also recent necrosed glomeruli and tubules. Both kidneys exhibited similar conditions.

The second patient, also a multipara, was admitted to hospital on March 17th in a dazed and stupid condition. There was a history of eight fits before admission, and patient took another immediately after admission. Temperature was 99.5°. There was œdema of the legs. The urine contained albumen. The stomach and rectum were washed out, and a saline infusion given. On March 19th, patient passed ℥ 50 of urine. On March 20th, at 5 A.M., delivered naturally of a healthy child. During the 20th she passed ℥ 110 urine.

March 22nd.—Forty-eight hours after delivery fits began, by noon she had 15. Bled ℥ xv. Morphia given, gr. ½, and later a further gr. $\frac{1}{30}$. Convulsions, however, continued every 10-15 minutes. Chloroform was given, 7-7.40 P.M., during which time there were 6 seizures. At 10.40 P.M. further ℥ xv blood removed, and saline infusion given. Urine now gave no albumen reaction.

March 23.—Fits more frequent, every 4-10 minutes, occurred even during chloroform administration, which was maintained for over 90 minutes.

At 11 A.M., lumbar puncture performed; the cerebro-spinal fluid ran during fits, but only dropped slowly between fits. Cocaine gr. $\frac{1}{8}$ was injected.

The patient was now in a very serious condition; the temperature was 103°, the pulse was weak and irregular. At 9 P.M., chloral and bromide were given.

March 26.—The temperature was subnormal, the skin and conjunctivæ were markedly jaundiced.

March 27.—The fits now ceased, over 200 having occurred in all. Condition steadily improved, and on March 28 the pulse and temperature were normal.

From March 17 on to March 27, patient's mind was a com-

plete blank; she was quite unable to remember anything which had taken place.

Drs Barbour, Haultain, James Ritchie, Haig Ferguson, and the President made remarks on the paper, and Professor Jardine replied.

Dr Barbour read notes on a case of broad ligament cyst with twisted pedicle and extensive hæmorrhages into the broad ligament.

The patient, æt. 40, had an attack of abdominal pain and vomiting four days before admission. On admission the pulse was found to vary from 130-140, the temperature was 100°. The thyroid was greatly enlarged. On abdominal examination, a cyst tumour was found in the lower part of the abdomen and a solid tumour in the pelvic cavity. On opening the abdomen a large fibroid was found in the pouch of Douglas; it was without adhesions, and had a very thin pedicle. A thin-walled cyst, containing a large amount of blood, was found between the layers of the broad ligament. Patient died 30 hours after operation. At the post-mortem, septic bronchitis of some standing was found, the larger bronchi being filled with pus. There was no pelvic peritonitis. On the left side blood was found in the cellular tissue of the broad ligament, passing along the infundibulo pelvic ligament, following the course of the ovarian vein to within 1½ inches of its junction with the renal vein. The ovarian vein was found intact throughout its whole course.

Dr Barbour also read notes on a case of abdominal hysterectomy for inversion of the uterus. The inversion was first noticed six weeks after delivery. The patient complained of neither pain nor hæmorrhage. On examination the fundus was found in the vagina. Attempts at digital reposition were only partially successful. A week later the abdomen was opened. The uterus was incised and the inversion corrected. Owing to the fact that the uterine muscle seemed to have undergone fatty change, supra-vaginal hysterectomy was performed.

The specimen on subsequent examination showed fatty changes in the sub-peritoneal muscular tissue. The inverted portion of the uterus which had been lying in the vagina was found on microscopic examination to be devoid of epithelium and had no trace of gland structure. It was covered simply by a layer of dense connective tissue.

The possibility of this fatty change is of importance in determining the choice of operation for inversion.

Mr Carmichael read a paper on "Hernia of the Uterine Adnexa."

Glasgow Medico-Chirurgical Society

THE fifteenth ordinary meeting was held on Friday, May 4—the President, Dr Lindsay Steven, in the chair. There was a large attendance.

1. Dr Walker Downie showed a preparation from a sarcoma of the temporal dura mater in a young girl, which had simulated suppurative mastoiditis during life. The patient had first shown a polypus projecting from the ear, and this was removed; as pus was present, the mastoid bone was opened. The patient died, however, and post-mortem a tumour was found on the temporal dura mater indenting the temporo-sphenoidal lobe, this depression being surrounded by half an inch of softened brain-tissue. The tumour was very vascular, mainly spindle-celled sarcoma, and sprang from the dura.

2. Dr Alexander Napier gave an account of a case of typhoid fever in which the symptoms were mainly confined to the kidney. The patient was a man of 26, who was affected apparently with cold in the head on July 11th, 1905. On the 16th, the urine was red from blood, and again on the 30th, and up to August 2nd, when he had to go to bed feeling very ill. There was sweating, high fever, and much headache. The urine was dark brown, contained a great deal of albumin, much blood, tube-casts, and a large bacillus, in great numbers. It was present at every micturition, and when a specimen was sent to Dr R. M. Buchanan, City Bacteriologist, he found it to be an involution form of B. Typhosus, and that organism was got in pure culture from the urine. In the form found in the urine there was deep staining at the ends, and a clear space in the centre. Tested against a good typhoid serum, it clumped in dilution of 1-100 in 15 minutes, and in 1-1000 in 1 hour. The stools examined on August 22nd showed no typhoid organism. The latter was present in the urine up to November 21st, but was gone by the end of December.

3. Dr Brownlie, Superintendent of Belvidere Hospital, read notes on six cases of pyelitis occurring as a complication of typhoid. In all, somewhat late in the illness, pus and albumin appeared in the urine, usually blood as well, and always tailed epithelial cells from the kidney. On the last case, which died, Dr Chapman had done a careful autopsy, and found the left renal pelvis filled with fluid which yielded pure B. Typhosus. There was a somewhat necrosed area running up from one of the pyramids, and the epithelium lining the renal pelvis was much degenerated. These cases were discussed by Drs Duncan, Glaister, Sloan, and the President, and Drs Napier and Brownlie replied.

4. Dr Joseph Glaister read notes of two cases of cerebro-spinal meningitis which had just occurred in his practice. They were children of three and eight years who had just come in from the country to Glasgow. The first case, the girl of three, took ill on April 14th with restlessness, headache, vomiting, and by April 16th there was retraction of the head. The temperature was never very high, but the pulse 140 or over, the pupils were dilated, and there was a petechial rash on the abdomen. At the date of this paper (May 4th) she was just dying. The second case, a girl of eight, took ill the day after her sister (April 15th). Her symptoms were very similar, but there were also some convulsive movements of the legs, and the thighs were kept much flexed on the abdomen. She died 14 days later. Lumbar puncture performed on her yielded fluid from which Dr R. M. Buchanan isolated the diplococcus intracellularis of Weichselbaum.

THE sixteenth ordinary meeting, and the last for the current session, was held on Friday, May 11th—the Vice-President, Dr Walker Downie, in the chair. There was a large attendance.

1. Dr Alfred Young showed (*a*) a patient on whom he had operated for acute intestinal obstruction due to the vermiform appendix. The patient, a man of 63, had had appendicitis four years before, and had for some time past suffered from constipation. Four days before admission he had obstruction, pain, and vomiting. Malignant disease was suspected, and the abdomen was opened to show a nodular mass in the right iliac region crossed by a tense band. To reach this a second incision was made in the right flank, and the constricting band was found to be the appendix, with a large bulbous end adherent to small bowel, and with a loop of small bowel strangulated below it. It was readily removed and a good result secured. (*b*) In the next place Dr Young showed two cases of sarcoma of the popliteal space. The first was that of a man of 55 years, a mason, who for some months previously had had pain in the calf, heel, and sole. For some time nothing definite could be felt, but at last a small lump was felt. The area and nature of pain suggested to Dr Young infiltration of a nerve trunk rather than pressure, and on operating he found a typical sarcoma at the upper and back part of the tibia, involving the internal popliteal nerve and the tendon of the plantaris. Amputation was done. The patient died three months later, possibly from metastasis. The other case was that of a lady, aged 39, who had a large swelling in the upper part of the popliteal space, with no nerve-symptoms. It was found to be fairly localised, and could be removed with only the sacrifice of a little muscle.

It was a myxo-sarcoma. These cases were discussed by Drs Geo. Buchanan, Rutherfurd, and Adamson.

2. Dr T. K. Monro described shortly a case of acute (lobar) pneumonic phthisis, and showed the lung. He said that phthisis pulmonalis, apart from the miliary form, might be either acute or chronic. Of the former there were two varieties—the acute pneumonic, affecting one or more lobes of one lung; and the broncho-pneumonic, involving both lungs. Of the chronic variety there were two subdivisions also—chronic catarrhal or caseous phthisis (the common form) and fibroid phthisis. His patient was a lad of 18, who had consolidation of the upper lobe of the left lung, and a high temperature, suggestive of pneumonia. There was no crisis by the seventeenth day, however, the sputum contained tubercle bacilli but no pneumococci, and there were hollow sounds in front, suggesting an old cavity. The family history was very bad. The illness went on for seven weeks, when the temperature fell by lysis. Albuminuria and hæmaturia supervened, however, and the patient died from uræmia. Post-mortem the whole of the upper part of the left lung was solid and looked like a sarcoma, but round about it were dotted tubercles. The kidney showed sub-acute parenchymatous nephritis apparently not tuberculous.

3. Dr R. M. Buchanan gave a short communication on paratyphoid fever, a condition only really recognised within the last ten years. It was of interest, however, to note that Bollinger as far back as 1881, and Eberth in 1883, expressed opinions regarding cases of doubtful or abortive typhoid, which probably were paratyphoid. Our first real knowledge was due to observations made by Achard and Bensaude in 1896, who found that a case of arthritis and cystitis was due to a paratyphoid organism, and Gwyn first in 1898 made a clinical diagnosis by isolating the bacillus paratyphosus from the blood. Fuller investigations were made by Schottmüller in 1900-1901, by Kürth in 1901, and by Brion and Keyser in 1902. The organisms were of two types, as seen in Schottmüller's A and B bacillus, the A belonging rather to the colon family, the B to the typhoid. As a rule the illness was sporadic, but epidemics had been reported from the States, Germany, and France. Some six cases had been detected in England and one in Ireland, but till quite recently none in Scotland. The possibility of this form of illness being commoner than is supposed had been forced upon him, both from the diminution of true typhoid and from the fact that not unfrequently the Widal test proved negative where the clinical data pointed to enteric. The symptoms of paratyphoid were much the same as those of typhoid, but perhaps a trifle milder. Incubation was about fourteen days, and roseolar spots

appeared about the twenty-first day after infection as in true typhoid. The prognosis was much better, but a few fatal cases had been reported. No ulceration of the bowel took place. The serum of such a patient possesses a great power of agglutinating the bacillus paratyphosus, even in such high dilution as 1 in 10,000.

The paper was discussed by Drs Edmiston, Adamson, Carslaw, and Carstairs Douglas, and Dr Buchanan replied.

4. Dr James Scott showed (on behalf of the President) specimens of cystic degeneration of the kidneys.

Glasgow Pathological and Clinical Society

THE eighth and last ordinary meeting for this session was held on May 14—the retiring President, Professor Muir, in the chair. There was a good attendance. Dr Lindsay Steven was elected President for the ensuing year, and Dr J. Crawford Renton Vice-President.

1. Dr Renton described two cases of supra-scapular amputation of the arm, and showed the specimens. The first case was a man of forty, who had an ulcer on the forearm in 1900. There being a history of syphilis, this was thought to be specific; it proved epitheliomatous however, and amputation was done at the middle of the upper arm. In April 1903 there was recurrence in the stump, and disarticulation at the shoulder-joint was carried out. The growth was now described as a spindle-celled sarcoma! In February 1906 there was again recurrence and a large tumour filled the axilla. This with the scapula and the outer two-thirds of the clavicle was removed. There was little bleeding and recovery was excellent. Curiously, now the growth had reverted to the carcinomatous type.

The second case was that of a woman of sixty, who came to hospital in February of this year, with a large tumour of the upper half of the humerus, which was found to be fractured. The mass reached into the axilla. Supra-scapular amputation was performed and a good recovery ensued. The method adopted in both cases was Berger's, and the mortality was but little higher than in amputation at the shoulder-joint; difficulty was sometimes experienced with the sub-clavian artery and vein. The growth in the latter case was a carcinoma with cells of the squamous type.

Professor Muir, in discussing the first case, said that observations of Ehrlich and others had recently proved that cells of one type of malignancy could by transplantation be transmuted

into a different type—epithelial into connective tissue, for example—but he could hardly conceive that after such a change the cells would on a third occasion revert to the epithelial type. He was inclined rather to the view that a mistake had been made in regarding the first recurrence as sarcomatous.

2. Dr G. A. Allan and Dr J. S. Dunn described a rapidly fatal case of cerebro-meningitis, and showed bacteriological specimens. The patient was a boy of eleven years who was admitted to the Western Infirmary on April 14, in stupor, restless, and having muscular spasms. His illness had commenced at 3 A.M. the same day, with moaning, twitching, and stiffness of the body; the bowels had moved once. There was a vague history of headache for a month previously, and a brother had been ill in the same house at Christmas with pneumonia and head-symptoms. His temperature in hospital was 101.8° F., and he rolled about with occasional attacks of true rigidity; knee-jerks were present, but neither ankle clonus nor Babinski's nor Kernig's sign could be elicited. Tâches cerebrales could be produced; there was no optic neuritis, but there was some nasal discharge. There was no rash, the leucocytes numbered 33,000, and there were enlarged glands in the abdomen. The urine was dull and smoky, contained blood, albumin, and casts, but no sugar. Death occurred thirty-four hours after first onset. Lumbar puncture was done shortly before death.

Dr J. S. Dunn said he inoculated plain agar and blood agar tubes with the cerebro-spinal fluid, and obtained a dew-like growth of the diplococcus intracellularis. The same organism was clearly seen in leucocytes in the fluid from lumbar puncture, this fluid consisting almost wholly of leucocytes. The brain showed the appearances typical of an acute leptomeningitis. The case was discussed by Drs R. M. Buchanan, Barr Pollock, and the President, and Dr Allen replied.

3. Dr Kennedy Dalziel showed the kidneys and ureters from a case where transplantation of the ureters had been done for extroversion of the bladder. The case was a boy of three years, much emaciated and eczematous. He opened the abdomen, and, dividing the ureters, simply passed each through a slit in the wall of the rectum, and stitched them to its outer coat. The child did very well and soon could retain the urine for several hours. All went well for two months, when, unfortunately, the child got an acute ileus from a coil of small intestine passing under an adhesion, and died.

4. Dr Barr Pollock showed microscopic specimens from a case of sarcoma of the choroid, and Professor Muir, specimens from three cases of infarction of the liver.

Glasgow Southern Medical Society

THE sixteenth meeting of this session was held on Thursday, May 3—the President, Professor Stockman, in the chair.

Dr Carswell read a paper on "Curable forms of insanity," and at the outset referred to Maurice Craig's broad classification of cases of insanity into curable and chronic—a not very satisfactory grouping, the latter term being too indefinite. Correct diagnosis was of the first importance as regards prognosis, and for this time was needed. But certification could not wait on this, for obvious reasons, and so in the certificate no true diagnosis was given, merely facts sufficient to establish unsoundness of mind. Referring to the term "borderland cases," introduced by Andrew Winter in 1875, Dr Carswell said there was strictly speaking no borderland in insanity any more than in scarlet fever. Men were often apt to regard cases as incurable which after all did well. It was true that the percentage of recoveries on cases admitted to asylums was only 40, and was getting less, but this was due to the greater admission of cases of senile dementia, etc. Besides, many cases get well without going into hospital. He would urge a plea for diagnosis of early cases, which for this purpose must be studied, and he would say also that one should not label a case simply as mania, melancholia, or recurrent insanity, as if that finished the case, but that each should be studied individually, noting the whole life history of the person, when it would often be found that this attack was but a phase in the course of a neurotic or degenerate life.

Dr Carswell then gave the classification he liked, viz. that proposed by Dr Macpherson in his Morison Lectures. In this there are five large groups with certain subdivisions as follows:—(1) Mental defects (idiocy, etc.); (2) confusional and toxic insanities (alcoholic, puerperal, etc.); (3) recurrent insanities (mania, the neuroses, obsessions, and so forth); (4) dementia; (5) senile and pre-senile forms. The speaker touched on these in a little detail, and illustrated his remark by reference to cases of incipient insanity, etc., in the Eastern District Hospital (Glasgow Parish Council), where cases of mental disorder were studied and treated, uncertified, in a mental hospital.

The paper was discussed by Drs Ebenezer Duncan, Macdonald, Wallace Anderson, and the President, and Dr Carswell replied.

Fifeshire Medical Association

THE spring meeting of the Fifeshire Medical Association took place within the Duncan Institute, Cupar-Fife, on Friday, 4th May. In the unavoidable absence of the Secretary, the minutes were read by Dr Macdonald, and approved.

The report of the Council anent the proposal to arrange for the examination of pathological material was then considered, and the President moved its adoption, which was seconded by Dr Dow, and unanimously carried after some discussion by Drs Nasmyth, Graham, Macdonald, and Macgregor. It was agreed to request the Fife County Council to receive a deputation from the Association.

The President then introduced Dr Dawson Williams, Editor of the *British Medical Journal*, who delivered a scholarly address on "Medicine in some Mediæval Universities," which will appear in next month's *Journal*. On the motion of the President, seconded by Dr Dow, a most hearty vote of thanks was accorded to Dr Dawson Williams for his very informing address.

The invitation from the Directors of the Ochil Hills Sanatorium to visit that Institution on Friday, 15th June, was then considered, and it was resolved to accept the same, and to make arrangements with the Hon. Secretary of the Fife Branch, British Medical Association, for a combined meeting of these Associations.

This concluded the business of the meeting. The members then dined together at the Tontine Hotel. Dr Norman Walker occupied the chair, and Dr Dow, LL.D., Dunfermline, Dr Dawson Williams, London, and Mr W. D. Patrick, County Clerk, were present as guests. After the toast of "The King" had been duly honoured, the Chairman called on Dr Nasmyth to propose a toast, "The Health of Dr Dow." Dr Nasmyth spoke with experience of the extent of Dr Dow's work, having acted as *locum tenens* and as assistant to him in days gone by. After nearly fifty years of active practice, Dr Dow proposed to retire, and they would all wish for him that he might long enjoy his well earned repose. They were there to congratulate him also upon the honour which had recently been conferred upon him by his Alma Mater, an honour won by faithful service in the interests of that ancient University. He asked them to drink to the oldest, and at the same time the youngest, doctor amongst them.

Dr Dow, in reply, thanked the members for their kind response to the toast. He was one of the original members, of whom only few were now present. He believed in the Fifeshire

Medical Association. It was bound to do good in the County, and it was of great importance to have addresses from time to time from distinguished guests like Dr Dawson Williams, to whose address they had all listened with such pleasure.

The Chairman then asked the meeting to drink to the health of Dr Dawson Williams, whose work as the Editor of the *British Medical Journal* was one the importance and difficulty of which could scarcely be over-estimated. Dr Walker, as a member of the *Journal* Committee, could testify to the quality of that work.

Dr Williams, in reply, paid a graceful tribute to the culture and standing of the Scottish Medical graduates, who had reached a point in education superior to the great mass of men in other parts. He had enjoyed his visit to Fife, and would always keep it in kindly memory.

Editorial Notes and News

The Journal.

WITH this number we complete the eighteenth volume of the *Scottish Medical and Surgical Journal.* We have stood firm on the principle that medical journals should be under direct professional control, and we rejoice to see that principle now unanimously accepted in Scotland.

The Directors will shortly lay before the Shareholders their account of the most successful year in our history, and they will also announce that they have arranged that in future the Journal will be published for them by Messrs Wm. Green and Sons, who are so well and so favourably known to the medical profession. Under their capable management we look forward with much confidence to the future.

Post-Graduate Teaching in Edinburgh.

AS will be seen from our advertising pages a series of vacation courses will be held in autumn. The syllabus has been so carefully drawn up, that almost any combination of classes may be attended. Vacation courses in other faculties have been a great success in Edinburgh, and so much thought and energy has been expended in the organisation of this, that we hope it will be as successful as its promoters desire. We shall be able to give fuller details next month.

The Cinematograph in Medicine.

THE cinematograph has up to now been particularly associated with the practice of certain surgeons whose skill and dexterity were thus perpetuated for the benefit of future (and the present)

generations, and it cannot be said to have been very favourably received by the profession as a whole. Against Dr Chase, however, no stones can be thrown. He is not in practice, and has employed this his hobby for the real benefit of Scientific Medicine. At his demonstration in the College of Physicians on May 16th, he showed in a very realistic manner a series of Epileptic fits, and other cases showing Athetosis, Chorea, and Rhythmic motions which cannot fail to be of much value in teaching. The films can be multiplied indefinitely, and one can easily see the great value of the permanent and accurate record of individual cases. While the cinematograph is comparatively an expensive instrument, the "penny in the slot" machine, which can also be used in demonstrating the movements, can be had at a quite moderate price, and the revenue which it may bring in should commend it to those University authorities who are always on the look-out for new sources of revenue. Instead of smoking cigarettes in the corridors, students might spend a penny on a demonstration of the ataxic gait or of an attack of "Grand Mal."

Royal College of Physicians of Edinburgh.

A QUARTERLY meeting of the Royal College of Physicians of Edinburgh was held on Tuesday, May 1st, 1906—Dr Playfair, President, in the Chair.

John Dixon Comrie, M.A., B.Sc., M.B., Ch.B., was introduced, and took his seat as a Fellow of the College.

On a ballot the following Candidates were admitted to the membership of the College after examination:—Augustus Kinsey-Morgan, M.D., M.R.C.S. Eng., Bournemouth; Edward Collett Hort, L.S.A., L.R.C.P.I., San Remo; William Augustine M'Enery, L.R.C.P. Lond., M.R.C.S. Eng., San Francisco; Alfred Nolan Fell, M.B., Ch.B., Edinburgh; Russell Gerald William Adams, L.R.C.P. and S.E., Edinburgh; John William Keay, M.B., Ch.B., Edinburgh.

The Registrar reported that since the last quarterly meeting twenty-seven persons had obtained the Licence of the College by examination.

Annual Report regarding the Laboratory.—The Curator submitted his Report for the last year regarding the Research and Reporting Work undertaken in the Laboratory during the year, and the expenditure incurred. The Report showed that 36 workers had been engaged in research; that 2479 specimens had been reported on, being an increase of 53 on the number for the previous year; and that the expenditure had amounted to £1217, 15s. 0½d. The Report was adopted by the College.

Dr James Andrew was re-elected a Representative of the College on the Conjoint Committee of Management of the Triple Qualification.

It was intimated that Dr A. R. Urquhart had been appointed Morison Lecturer for the ensuing session.

The Royal College of Surgeons.

AT a meeting of the College held on May 16th, two important appointments were made. Dr M'Kenzie Johnston was appointed Secretary and Treasurer in succession to Dr Cadell, who has served the College faithfully for many years.

Mr Hodsdon was appointed the representative of the College on the General Medical Council in succession to Sir Patrick Heron Watson, and will most capably represent the views of the younger generation of teachers.

The following gentlemen having passed the requisite examinations, were admitted ordinary Fellows:—

Hirjee Nowroji Anklesaria, L.M. & S., Bombay; Charles Mackie Begg, M.D., M.R.C.P.E., Dunedin; Reginald Bryson, L.R.C.P. & S.E., Captain, Indian Medical Service; John Burdon-Cooper, M.D., Bournemouth; Robert Sturgeon Cocke, MR.C.S.Eng., London, W.; James Mathieson Kirkness, M.B., Ch.B., Edinburgh; Siavax Byramji Mehta, L.M. & S., Bombay; Victor Edgar Sorapure, M.B., Ch.B., Liverpool.

The Medal and set of books presented to the College by Colonel William Lorimer Bathgate, in memory of his late father William M'Phune Bathgate, F.R.C.S.E., Lecturer on Materia Medica in the Extra Academical School, was awarded, after the usual competitive written examination in Materia Medica, etc., to Mr James Hay Johnston, 18 Plewlands Terrace, Edinburgh.

The Physiological Effects of Life in the Alps.

A FACETIOUS Swiss guide is reported to have declared that he could tell from the nationality of his tourists how they would behave when they reached the top of a mountain. An Englishman on such an occasion immediately demands food. A Frenchman goes into raptures over the view. An Italian embraces the guide. A German produces some instruments and begins making scientific observations.

That there is some truth in at least the last of these assertions may be readily proved from the columns of physiological and other scientific papers, though others besides Germans have taken some part in increasing our knowledge of the physiological

effects of high altitudes. The names of Paul Bert and Mosso occur to one as having done valuable work in this direction.

Our contemporary *Nature* (April 12, 1906) calls attention in a lengthy review to what appears to have been a particularly carefully planned expedition, undertaken by a party of Germans, for the express purpose of carrying out a series of physiological observations at high altitudes. The members of the expedition included two professors of physiology, two assistant professors, and two younger members of the medical profession engaged in physiological research. The headquarters of the expedition was Brienz, in the Bernese Oberland. The earlier observations were made at the summit of the Brienz Rothhorn (7713 feet), and the later at the mountain laboratories established by Mosso in the Monte Rosa district. Of these the lower, on the Col d'Olen, is at a height of 9420 feet, while the higher, on the Signal Kuppe of Monte Rosa, is at 14,965 feet.

The results arrived at by the expedition have recently been published in a work[1] of some 500 pages, which evidently contains a great deal of interest and importance to physicians. Mountain health resorts have for long enjoyed a great reputation, especially for the treatment of phthisis, but the discovery that phthisical patients may do very well under sanatorium treatment in this country has led many physicians to believe that the benefits of a residence at such a place as Davos may be due to conditions which it is possible to obtain nearer home. Physiological observations, however, clearly show that altitude, *per se*, is a very important factor in whatever benefit results from a stay among the mountains.

The results of the Brienz expedition are summarised by *Nature*[2] under the following heads:—

(1) *Blood Changes.* The red blood corpuscles per c.mm. are greatly increased in number, and an examination in animals of the red marrow shows that this tissue is in a state of greatly augmented activity.

(2) *Digestive Efficiency.* Altitudes up to 8000 feet exert a very favourable influence on the digestive process. At very high altitudes, 14,900 feet, the efficiency of digestion was greatly impaired.

(3) *Oxidative Processes.* At moderate and high altitudes the oxidation processes were greatly increased. The increase is set down to two circumstances: firstly, the diminished thermogenetic capacity of the muscles, which are impaired by the

[1] *Höhenklimen und Bergwanderungen in ihrer Wirkung auf den Menschen.* By N. Zuntz, A. Loewy, F. Müller, and W. Kaspari. Pp. xvi. + 494. Berlin: Bong & Co., 1905.

[2] But see the extended summary in *Nature*, April 12, 1906.

inadequate supply of oxygen in their circulating blood, thus throwing the necessary heat production upon the oxidation of more complex compounds than those offered by the muscles; secondly, the presence in the tissues of abnormal oxidisable substances.

(4) *Proteid Metabolism.* The effect of altitude on proteid metabolism appears to be a storage of nitrogen. Its import exceeds its export. This excess was most marked on the Rothhorn—that is to say, at a moderate altitude persisted for a considerable time after return to a lower level. This implies the production of a phase of metabolism resembling that of the growing animal; it is, in short, a renewal of youth. At very high altitudes the gain is less apparent, but this is explained by the occurrence of mountain sickness.

(5) *Respiration and Circulation.* Cheyne-Stokes breathing was observed by the members of the expedition on Monte Rosa. At moderate altitudes the heart's activity is augmented, but at very high altitudes there appeared a great tendency to cardiac weakness.

The practical bearing of the observations are thus summed up: "Moderate altitudes of less than 8000 feet appear, in consequence of the lessened atmospheric pressure, to benefit the whole organism in the following particulars. The tissue which produces the oxygen carriers of the blood is stimulated with greater activity, the oxidation of abnormal substances is increased, the heart's action is augmented, the respiratory muscular mechanism is brought into more energetic use, and, finally, that proteid assimilation which is so directly related to cell growth and cell respiration assumes the phase present in the young and growing animal. In consequence of all these changes, and particularly the last one, altitudes of from 4000 to 7000 feet must exercise a most beneficial and even rejuvenating effect. In the case of many invalids the effect will be to arm the body for its fight against such insidious foes as the tubercle bacillus, and to hasten recovery in all cases of convalescence from bodily or mental prostration. Only those whose circulation is seriously impaired, directly or indirectly, by organic disease are debarred from the probability of such beneficial effects.

UNIVERSITY OF EDINBURGH

Faculty of Medicine

THE following is an official list of those who have completed the first, second, and third professional examinations respectively:—

First Professional Examination.—R. M. Allan, Edward Anderson, F. G. Bell, R. A. Bell, Eveline R. Benjamin, J. G. Boal, C. J. G. Bourhill, A. M. Britton, G. S. Brown, H. H. Brown, J. F. Brown (with distinction), Peter de Bruyn, E. C. Burke, G. D. Cairns, L. D. Callender, A. F. Calwell, W. W. Carlow (M.A.), G. J. Carr (B.A.), J. A. H. Carter, R. B. Chamberlain, J. P Charnock, Percy Chisholm, F. O. Clarke, W. G. Coltart, E. S. Craig, T. D. Crawford, Josias Daneel, William Darlington, James Davie, I. D. Dickson, John Drummond, Isabella G. Emslie, James Erlank, W. J. Feltham, Annie G. Fergus, E. L. Ferguson, J. B. Ferguson, F. P. Fouche, C. M. Ganapathy, F. P. Gibson, T. J. Gilmore, J. G. Gow, Colin Grant, R. W. Greatorex, Annie C. Greenep, W. P. Grieve, E. B. Gunson, H. J. Guthrie, T. E. Guthrie, R. H. Hamilton, D. S. Harvey (with distinction), J. B. Haycraft, Alexander Hood, John Hunter, A. P. W. Hutton, A. B. Jamieson, A. M. Jones, G. J. Joubert, Agnes E. Keen, T. D. Kennedy, J. C. J. Khambatta, S. G. Kriegler, E. C. Lang, D. T. M. Large, Leonard Leslie, A. Sinclair Loutit, J. F. H. Lutze, D. M. Lyon (with distinction), K. B. MacGlashan, J. M. M'Keand, A. H. G. Mackintosh, D. J. M'Laren, Elizabeth Macleod, Mary Macmillan, R. C. Malhotra, D. B. Maunsell, G. M. Miller, S. P. Moore, M. M. Morrison, William Morrison, Rhoda M. Murdoch, O. A. J. N. Muriset, Kishanlal Nehru, R. M. Nicholson, F. H. Noronha, W. H. Pallett, Dora E. Paterson, P. N. Pedersen, A. Z. Philips, J. A. Pienaar (B.A.), C. K. Pole, A. H. Porter, W. D. Reid, D. T. Richardson, W. S. Robertson, Lizzie Rose, William Russell, C. M. Schaffter, J. W. Senter, Daisy L. Shawyer (B.A.), Alexander Simpson, F. M. Sinclair, D. R. Bedell Sivright (B.A.), T. W. Smart, Gertrude M. Smith, T. C. Smith, R. O. Spencer, G. H. Stevenson, John Stevenson (Roseneath Street), F. M. Stewart, J. D. G. Stewart, Malcolm Stewart, J. R. Stott, George Tate, L. W. Owen Taylor, B. C. Tennent, A. B. Todd, J. J. Tough, C. B. Tudehope, Jane A. Walke (Old Regns.), R. C. Wallace, A. M. Warwick, G. A. Wyon, R. B. M. Yates.

Second Professional Examination.—G. J. Adams, R. C. Alexander (with distinction), H. M. Anderson, William Bainbridge, Margaret W. Bartholomew, Lydia D. la Trobe Bateman (with distinction), G. L. Batra, A. R. Bearn, James Black, Henry Blyth, A. M. Bose, William Boyd, John Brander, L. A. P. Burt, Ellison Cansfield, J. A. R. Cargill, J. T. Carson, Peter Chalmers, D. G. Cooper, B.A.; H. S. Cormack, A. C. Court, J. C. Craig, M.A.; Emilie C. Creaser, John Crocket, J. M. Dalrymple, Purser Davies, J. M. Deuchars, P. S. Dias, A. L. Dykes, W. G. Evans, John Findlay, Thomas Gardner, A. I. Girdwood, R. L. Girdwood, J. A. Gordon, Peter Gorrie, A. G. M. Grant, J. C. B. Grant, J. K. Hamilton,

M.A.; James O. Hamilton, Robert Hannah, F. W. Hay, John Hewat, S. W. Hogg, J. D. Ingram, K. R. K. Iyengar, F. E. Jardine, J. J. Jervis, W. P. S. Johnston, M. J. Johnston, J. V. Karve, H. W. Kerrigan, Catherine Kirk, M.A.; E. W. Kirk, R. A. Krause, F. R. Laing, C. L. Laurent, R. D. Laurie, H. R. Lawrence, M. A. Lindsay, A. S. Macbeth, John Macdiarmid, Ranald MacDonald, R. F. D. Macgregor, W. J. M'Keand, Kenneth Mackenzie (with distinction), A. C. M'Killop, D. R. C. Maclagan, I. R. MacLeod, Ada J. Macmillan, W. M. Macnab, David Macnair, E. R. D. Maconochie, S. E. Malherbe, A. C. Mallace, M.A.; John Marshall, R. C. J. Meyer, A. F. Miller, J. A. Mitchell, Flora Morrison, I. A. van Niekirk, E. F. W. Nixey, A. C. Norman, P. G. Palmer, A. B. Pearson, J. H. H. Pearson, A. A. W. Petrie, B. B. Phillips, Laura W. Pugh, J. J. van Rensburg, E. W. Richards, W. G. Riley, A. G. Ritchie, Agatha M. Robinson, D. H. Russell, John Scott (with distinction), J. T. Simson, E. W. Smerdon, W. B. Sommers, J. E. Spence, William Stobie, Adam Tait, A. L. Taylor, G. P. Taylor, J. Gordon Thomson, M.A.; J. J. Thomson (with distinction), N. G. Thornley, R. W. Lang Todd, Mary M. M. Turpie, Raymond Verel, F. H. de Villiers, A. A. Walbrugh, E. A. Walker, W. O. Walker, H. S. Wallace, L. E. B. Ward, F. K. te Water, W. H. te Water, F. W. Waterworth, Alexander P. Watson, M.A.; Hugh B. Watson, M.A.; H. L. Watson Wemyss, Adam White, J. L. Masterman Wood, R. L. C. Wuppermann, A. G. Yates, M.A.; W. A. Young.

Third Professional Examination.—J. B. Alexander, J. L. Annan, J. C. Ashton, Ernest Banks, A. C. Barker, C. B. Baxter, A. E. Bennee (with distinction), J. W. Bingham, J. A. Brand, Alexander Bremner, Thomas Buchan, Thomas Burrell, P. D. Cameron, R. J. Chapman, W. G. Cobb, W. D. Coghill, C. E. A. Coldicutt, C. H. Corbett, H. C. D. Cross, Mackenzie Douglas, J. C. Drysdale, G. L. Duncan, A. D. Edington (B.Sc.), Robert Edwards, P. A. Everard, J. Letitia D. Fairfield, W. P. Ferguson (M.A., B.Sc.), Mary S. Findlayson, W. S. Forbes, John Fraser, J. B. Gibson (M.A.), R. M. Glover, J. M. Grant, D. G. Gray, A. R. Gunn, D. J. Guthrie, George Henderson, W. S. Heron, A. Fergus Hewat, Matthew Heyns, James R. Hill, J. K. A. Hofmeyr, St G. M. L. Homan, J. H. Horne, Lloyd Hughes, T. J. Hughes, Alexander Hunter, H. B. Hunter (M.A.), Spencer Jackson, J. A. Jamieson, R. H. Jamieson (with distinction), Blanche M. L. Johnston, T. Arnold Johnston, W. D. Stoney Johnston, Daniel Johnstone (M.A.), G. G. Jolly (with distinction), S. W. Joubert, J. G. de Kock, G. F. V. Leary, J. H. Lechler, David Lees (M.A., with distinction), Cecil R. Lethem, G. L. Little, N. F. Lloyd, C. W. L. Luethgen, G. J. Luyt, Thomas Lyon, R. D. M'Allister, L. G. M'Cune, W. S. M'Cune, Angus Macdonald, James F. Mackay,

John L. Mackay (with distinction), A. T. Mackenzie (M.A.), R. E. M'Laren, D. J. M'Rae, Paula Maier, J. A. Manifold, A. H. M. Maxwell, F. W. Michael, G. G. Middleton, Margaret M. Miller (with distinction), A. P. Mitchell, J. A. Morris, John Morrison, James Muckart, Ara G. Murchison, William Murdie (M.A.), Meher A. D. Naoroji, Joseph Newall, J. J. H. Nelson, A. T. Paterson, C. F. Pattie (with distinction), J. S. Peebles, G. R. Pillai, W. J. Porteous (with distinction), O. E. Powell, N. H. Prior, D. H. Rai (B.A.), W. R. Ridley, Adam M. Robertson, Charles Robertson, David Robertson, W. A. Scobie, Francis L. Scott, W. J. Simpson, J. T. Simson, E. Drybrough Smith, F. F. S. Smith, R. A. Spence, Dorothy W. Stevenson, L. H. F. Thatcher, C. A. Thelander, C. P. Theron, David Thomson, William Thomson, W. Wilson Thomson, V. F. Usher, A. M. Vlok, Helen M. Wakefield, Martha B. Webb, J. C. B. Williams, J. L. Wilson.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

PSYCHIATRY

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CONSCIOUSNESS AND SENSATION, EMOTION, AND HALLUCINATION.

Consciousness and Sensation.—In the universe, as we know it, we recognise as three more or less distinct conceptions, matter, substance, or masses; energy, motion, or phenomena; and mind, soul, or spirit. The physicists of the older school were wont to describe matter as the body of the universe, and energy as the life. Matter, or that which occupies space, was the receptacle and vehicle of the energy, which in its turn animated the matter, inasmuch as in its various forms it consisted in vibrations or modes of motion of the molecules and atoms of matter. The revolutionary discoveries of recent years in the borderland of physics and chemistry, and the advent of the electron theory, lead us to conceive of each atom of matter as itself made up of a world of minutest particles in constant motion, and therefore as itself endowed with intrinsic energy. F. C. Gessner (*Amer. Journ. Ins.*, Oct. 1904) applies these ideas to the case of the living organism, and finds therein an explanation of the genesis of sensation, and therefore of consciousness

or conscious mind. Energy, he says, manifests itself objectively as motion, and subjectively as sensation. Every atom and molecule of the living body with its intrinsic energy implies objective motion or vibration, and subjective sensation or sensibility. Leaving this patent assumption—the inevitable jump—from the physical to the psychical for what it is worth, and looking at the question of the birth and growth of sensation and consciousness rather from the biological aspect, we know that the lowest forms of animal life, the unicellular protozoa, exhibit in their single cell of protoplasm all the fundamental phenomena of life. The simple amœba "lives and moves and has its being." It is contractile, and exhibits spontaneous or automatic movements. It is irritable, or sensitive to excitation by external stimuli, the irritability or sensitiveness or excitability being manifested by the visible contractile movements following the application of appropriate stimuli. The sensory and motor phenomena of the amœba are the main concern of its peripheral clearer portion. The central and more granular part of the cell, with the nucleus and vacuoles, is mainly concerned with reproduction and the various phases of nutritive function, namely, digestion, absorption, assimilation, secretion, excretion, respiration, and circulation. All higher animals (metazoa) are multi-cellular organisms, in which the individual living cells, while retaining the fundamental properties of living protoplasm and therefore resembling the amœba, are arranged in groups exhibiting a physiological division of labour and a corresponding morphological differentiation of structure. Special functions become developed in and assigned to special cells—which thereby acquire a special structure—to the subordination, but not complete exclusion, of the other common fundamental functions of vitality. Such is the line of argument by which W. H. B. Stoddart (*Brain*, Autumn 1903) is enabled to pass from the sensitiveness of the amœba to the consciousness of man. All living cells in the body have some sensation and therefore some consciousness; the neuron is the most sensitive cell and therefore the most conscious; the most sensitive neurons are the peripheral terminal sensory cells of the afferent system; the most conscious neurons are those of the psychical areas of the cortex cerebri.

Emotion.—In an able paper (*Brain*, Winter 1904) the same author, following the teaching of Professor James, points out that instincts and emotions are closely allied, both being of the nature of a sensation-complex, which is the outcome of a more or less involuntary motor response to the sensations, percepts, or ideas immediately experienced by the individual in various

situations, the only difference being that instincts bring the individual into more practical relation with the object of the sensation, percept, or idea. When a sensation is registered in one of the projection areas, or a percept or idea in one of the association areas, an efferent response takes place, mainly involuntary, which is indicated by such phenomena as contraction of the muscles of expression (motor), pallor or flushing (vasomotor), or secretion of tears or sweat (secretory). These muscular contractions, by pressure on the muscle-spindles of the striped muscles or on the allied structures of the unstriped muscle of blood-vessels or of glands, cause afferent impulses of muscular sense to ascend to the sensorium, to arouse therein secondary sensations which collectively form the actual emotion experienced. "Emotion is thus derived *e motu*, out of motion, and is a feeling compounded of sensations arising as a result of complex instinctive movements, which are as a rule reflexly aroused by the situation in which the individual is placed." These movements which arouse the emotion experienced by the subject himself, outwardly form the picture or expression of the emotion as seen by others, and they are remnants of instinctive reactions which in the past history of the race served a useful purpose.

As to the nervous mechanism concerned in emotion. Following the original sensation percept or idea registered in the area of cortex concerned, efferent impulses pass by way of the cortico-rubral fibres of M. and Mme. Déjérine, which arise from all parts of the cortex, especially the parietal, and traverse the thalamus to end at the red nucleus on the same side; thence they pass by way of the rubro-bulbar fibres, and the rubro-spinal fibres of Monakow, which decussate at Forel's crossway, to end at the large motor cells of the lowest level on the opposite side, being traceable in the vicinity of the lateral tracts of the spinal cord as far as the sacral region; thence they pass peripherally to the muscles, blood-vessels, and glands, whose movements give rise to the outward expression of the emotion, whilst their contractions on the muscle spindles and allied structures simultaneously cause afferent impulses to fly by way of the ordinary channels of muscular sense back to the sensorium again, wherein the resultant emotion is aroused as experienced by the individual. The cortico-rubro-spinal tract, which thus forms the pathway for instinctive movements in man, is the representative of the primitive motor tract for the transmission of all motor impulses in vertebrates lower than mammals, the lower vertebrata having no pyramidal system of fibres. The motor tract in birds is represented by cortico-thalamic and thalamo-spinal fibres, and possibly similar fibres in man may

also serve as pathways for the movements in the outward expression of emotion.

Applying the foregoing scheme of the nerve mechanism of emotion to the case of the morbid manifestations of emotion in disease, Stoddart would explain *excessive emotionalism*, (1) as met with in hemiplegia, general paralysis, alcoholic insanity, epileptic insanity, and possibly imbecility, as being due to a greater tendency for ordinary motor impulses to travel by way of the pristine system instead of by way of the more damaged or probably more degenerated—because more recently evolved —pyramidal system ; (2) as met with in mania, as being due to hyperexcitability of the mental cortex, in consequence of which minimal stimuli tend to discharge pristine as well as pyramidal neurons ; and (3) as met with in hallucination and paranoia, as being due to an excess of sensation or perception. Whereas *deficient emotional reaction*, as met with in senility, dementia, cretinism, and myxœdema, would be due to diminution of sensation or perception ; and as met with in melancholia, stupor, or katatonia, would be due to the muscular anæsthesia or fixation present, in consequence of which the component stimuli for the arousal of emotion are not served to the sensorium.

Hallucination.—There have been many papers recently on the pathogenesis of hallucination, and considerable discussion as to the essential site, height, or level of the lesion in the sensory realms. Hallucination is subjective false sense-perception, the subject of the hallucination believing that he sensates or perceives something in a sensory field, when the said something is in reality not present, and so cannot stimulate the peripheral sense organ in the ordinary way necessary for the arousal of the sense-perception. Thus a person imagines he hears a sound or voice when there is no such sound or voice to be heard. Those who favour what may be called the high or central or cortical theory of hallucination, consider it to be mainly a fault of the ideational, associational, or psycho-sensory centres, and rather an error of ideation than of perception or sensation. Tamburini says that just as epilepsy arises from an irritable condition of the psycho-motor cortex, so hallucination proceeds from irritability of the psycho-sensory centres of the cortex, which, when hyperexcitable, are able to produce sense-perceptions in mnemonic form. Roncoroni similarly explains hallucination as analogous to epilepsy, but says that there is a twofold mechanism — (1) hyperexcitability of the hallucinated sensory centres, which may be temporary or permanent, and unilateral or bilateral ; and (2) hyperexcitability of, and therefore diminution of inhibition by, the higher association centres.

Both of these factors usually are present, but only one may be present, and if the higher centres only are hyperexcitable, then they are so much so that they stimulate the lower ones to activity and so to sense-perception. Tanzi holds that all true hallucination is trans-cortical in origin; that is, a representative image or idea formed in a representative centre, instead of as normally ascending and associating itself in a higher association centre with other ideas and projecting itself externally as a movement, descends or flows back upon the sensory centre and arouses the corresponding sense-perception.

Those, again, who favour what may be called the low or peripheral or sub-cortical theory of hallucination, as Boris Sidis, and W. A. White, hold that hallucination is mainly a fault of the lower sensory neurons, these being largely in a state of dissociation, with a corresponding diminution of sensation and perception, such as is thought by some to occur during the onset of sleep. They say that in order to have a false sense-perception, there must be something in the environment to be perceived; that normally many sensations are not appreciated as such at all, and yet enter as a factor into the formation of the mental state at the time; and that sensations which do not, as a rule, rise into consciousness, may, if the condition of dissociation of sensory neurons be present, acquire an unusual value, and, being out of harmony with the actualities they represent, give rise to false sense-perceptions. Hallucination is well known to be more vivid at night when all is dark and quiet; and insane subjects who see imaginary visions or hear imaginary voices often keep their eyes shut, or their ears plugged with their fingers, wool, etc., and in marked cases may even seem to be partially blind or deaf at the time.

Stoddart (*Journ. Ment. Sc.*, Oct. 1904) has emphasised the importance of carefully testing all the sensory functions in cases of insanity, especially when hallucinations are present, and has shown that it is common to find a more or less extensive anæsthesia to touch and to pain (it is necessary to employ pain-tests, as by pin-pricking, for mere touch-tests are unreliable, as they fail to elicit any responsive gesture), the abdomen, however, usually escaping and remaining sensitive, and in such cases the epigastric sensation is frequently manifested. Diminution of sensation or perception in the sensory field, such as may depend on a condition of peripheral sensory neuronic dissociation, is therefore common in, and perhaps characteristic of, hallucination. But the peripheral factor, though, probably indispensable, is insufficient by itself to explain the pathogenesis of hallucination. The mere facts that visual and auditory hallucinations, that is, false perceptions by the senses of sight

and hearing, can be vivified in the dark and quiet of night, and can be exhibited by persons who are blind or deaf, themselves suggest that the disturbance is also essentially among the higher ideo-sensory and associational neurons; and so in all probability in the production of hallucination both higher and lower sensory neurons are at fault and functioning morbidly.

C. K. Mills and C. D. Camp (*Amer. Journ. Ins.*, July 1905) report the case of a woman of 63, whose sister had been insane, who was gradually becoming blind, who then had a cerebral seizure with resulting complete blindness, and who finally developed vivid visual hallucinations (*e.g.* visions of fire, and of men in her room threatening her with knives and pistols), with delirious excitement, ultimately dying from exhaustion. A careful microscopic examination of various regions of the brain revealed marked arterio-sclerosis, and in the calcarine area and adjacent occipital region, in the cortex and sub-cortex, but especially in the second and third layers of the cortex, old-standing degenerative changes of the neurons (especially pigmentary degeneration of the pyramids), which would account for the gradual blindness, and recent vascular changes of the nature of intense congestion with formation of many new capillaries which were probably related to the later appearance of the visual hallucinations. A. Pick (*Wien. klin. Wchnschr.*, Feb. 1905) records the case of a man of 42, a tabetic, who was totally blind from optic atrophy, but was subject to such distressing visual hallucinations (*e.g.* balls of light) that he wished his eyes removed; and he explains the hallucinations in this case as due to false interpretation of sensations arising from stimulation of undegenerated nerve elements by circulation of the blood in the retina, much in the same way as the visual hallucinations of delirium tremens have been explained as due to misinterpretation of impressions produced by the blood corpuscles circulating in the retina. Pick also records the case of a man of 40, a general paralytic, who, after an attack of paraphasia lasting a day, for the next week had unilateral hallucinations of hearing at the right ear, which was healthy, and would turn his head to that side as if to listen to them; and he adds that in this case probably a cortical lesion near the speech centre caused impulses to be sent to the auditory centre which aroused the hallucination.

The influence of attention in the genesis of hallucination is important, and probably explains many of the cases of unilateral hallucination of hearing, and also partially the phenomenon of the epigastric sensation already referred to. Epigastric sensation is specially associated with a more or less extensive tactile anæsthesia and analgesia, the abdomen, however, usually

remaining sensitive; and in these cases the patient's consciousness and attention, being dependent on sensation, are unduly directed to the abdomen, to which in consequence morbid sensations are apt to be referred. Similarly in the subjects of auditory hallucination, the common distribution of the cutaneous anæsthesia, combined with the influence of the patient's attention, probably explains the peculiar phenomenon of epigastric voices. W. v. Bechterew who has recently emphasised the importance of the rôle of attention in the development and localisation of hallucination, points out that simply as the result of attention to any special part of the environment or of the body, the subjects of auditory or visual hallucinations come to refer them to the part in question.

SURGERY

By W. J. STUART, M.A., M.B., F.R.C.S.
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MASSAGE OF THE HEART FOR ARREST DURING ANÆSTHESIA

HOWEVER skilful the anæsthetist, a certain number of deaths from heart failure during anæsthesia inevitably occur. In the *Revue de Chirurgie* for March there is a summary by Ch. Lenormant of all recorded cases of massage of the heart under these circumstances; and a procedure which holds out any hope of diminishing the mortality in these distressing cases is well worthy of attention. When complete cessation of the heart's action has occurred, is it possible several minutes afterwards by direct massage of the organ to re-establish its contractions, and, if so, will the contractions persist, and can they result in the recovery of the patient? Such are the questions which a few years ago would have been answered in the negative, but to which it now seems possible to give an affirmative reply.

Experiments on dogs have been numerous, especially since 1900. The first were recorded so far back as 1874 by Schiff, who obtained a "resurrection" when the heart had been rendered motionless by chloroform for periods up to 11½ minutes, though voluntary movements were not recovered, and the animals died some hours later. Similar results were published in 1898 by Tuffier and Hallion. In 1900, Prus made investigations upon 21 dogs, commencing massage at periods varying from 55 seconds to an hour after arrest of the heart, and obtained successful results in 76 per cent.; but unfortunately he sacrificed the animals at the conclusion of each experiment. One dog, however, which he preserved, was still living eight

months later. About the same time a very important new fact was observed by Prévost and Battelli. They found that in many cases, and especially in those which proved negative, rhythmical compression of the heart produced first fibrillary tremors of the myocardium instead of true contractions. When these fibrillary tremors have once appeared, it is very difficult to stop them, and while they persist, they prevent normal movements of the heart. Battelli was successful in stopping them and in exciting normal contractions by the application of electricity directly to the heart. All these investigators gained access to the heart through an opening in the thoracic wall, respiration being maintained by blowing air into the trachea through a tube. Bourcart, however, adopted the abdominal route, compressing the heart through the intact diaphragm. D'Halluin, in a series of between seventy and eighty experiments, found that in cases where the fibrillary tremors appeared it was hardly possible to restore normal contractions. He also established the fact that the longer the interval between the arrest of the heart and the commencement of massage, the more likely are these fatal tremors to appear. He found the most efficacious means of preventing or stopping the tremors to be the intravenous injection of large quantities of chloride of potassium. Massage of the heart seems to act by emptying the distended organ, by acting as a mechanical excitant, and by establishing an artificial circulation through the body, and especially through the coronary arteries. With the aid of chloride of potassium injections, d'Halluin raised his proportion of resuscitations from 37 to 65 per cent. He believes that the toxic action of the salt on the myocardium stops all movement, and therefore the dreaded fibrillary tremors, and that thereafter immediate massage of the heart mixes the poison throughout the blood, "disintoxicates" the myocardium by the passage of relatively pure blood, and enables it to resume its rhythmical contractions.

The results of experiments on dogs may be summarised thus: The animals had presented for varying periods every sign of death, the heart when exposed being absolutely flaccid and motionless, and the circulation, as indicated by the most delicate physiological apparatus, being completely arrested. The heart could, nevertheless, under the influence of massage, be restored to its normal action, all the signs of life returning, and the animal living for months unaffected by the death through which it had apparently passed. The chief obstacle to resuscitation is the appearance of fibrillary myocardial tremors. When they appear, massage alone is seldom successful, but success is sometimes obtained by at the same time applying an alternating current of medium tension, or injecting chloride of potassium.

Direct massage of the heart in the human subject has been practised, or at least recorded, on twenty-five occasions. Three methods have been employed:—

1. *The sterno-costal route*, in which either by resection or flap direct access is obtained through the thoracic wall. In most cases the pericardium was opened; in some the massage was extra-pericardial, but in at least two of the latter the left pleural cavity had been accidentally opened, and the hand was introduced into it.

2. *The abdomino-transdiaphragmatic route*, in which the abdomen is opened above the umbilicus, the left lobe of the liver pressed down, and the diaphragm along with the pericardium incised.

3. *The abdomino-subdiaphragmatic route*, which resembles the second method, except that the heart is grasped and massaged through the diaphragm, which is not incised.

What are the relative advantages of these methods? The *sterno-costal* is indisputably the worst, and the fact that it was the original operation accounts for much of the early disrepute of heart massage. It requires a relatively longer time for its performance—a matter of great importance, for hitherto no recovery in man has been secured when massage of the heart has been delayed for more than eight minutes. The left pleural cavity is very liable to be opened, and it is probable that the resulting pneumothorax has been the determining cause of death in several cases. Moreover, the site of operation completely prevents, during the operative manipulations, the carrying out of the movements of artificial respiration, which is an absolutely essential accompaniment of heart massage, while even afterwards the opening of the thorax must modify the mechanical conditions of the circulation. The *abdomino-transdiaphragmatic route* avoids these faults. There is no risk of pneumothorax, artificial respiration is not interfered with, and access is rapidly obtained; but, should the massage be successful, the operator is faced with the very difficult task of suturing a large diaphragmatico-pericardial opening. The *abdomino-subdiaphragmatic route* is the best of the three. It possesses all the advantages of the transdiaphragmatic operation, is even more rapid—indeed in syncope during a laparotomy requires no further incision—and at its termination necessitates only the closure of an ordinary abdominal wound. Theoretically it may be objected that the interposed diaphragm will prevent a proper grasp of the heart being obtained, but clinically it is found that, in view of the complete relaxation of the diaphragm, which from the nature of the circumstances is necessarily present, there is no difficulty in grasping and compressing the ventricular portion

between thumb and fingers, or alternatively in exercising rhythmical pressure with one hand in the abdomen and the other applied to and fixing the precordial region. This route has a record of three complete and one temporary recovery with only one failure.

The results of the clinical cases of heart massage are at first sight disappointing. Of the twenty-five patients, only four were saved, that is, 16 per cent. But these figures are deceptive, for in sixteen of the cases the sterno-costal route was adopted, and probably respiratory difficulties formed a not unimportant factor in the fatal termination. A fairer estimate is got by classing the cases as positive and negative, the former embracing those in which, whatever the ultimate result, the heart has resumed a regular and spontaneous action which has persisted for some time after the cessation of massage, while the negative class includes all other cases.

Classified on this basis, the twenty-five cases give seventeen negative results (68 per cent.) and eight positive (32 per cent.). Of the twelve negative cases of which details are recorded, in four the result of heart massage was absolutely *nil*, in four fibrillary tremors were observed, and in four normal contractions were obtained, but disappeared when massage was stopped, or a few seconds afterwards. Possibly the fibrillary myocardial tremors, noted so often in negative cases in animals, may have occurred oftener, but, their importance not being appreciated, may have passed unnoticed or unrecorded. Of the eight positive cases, four recovered completely, while in the other four normal circulation persisted for from five to twenty-four hours after cessation of massage. The surgeons who obtained the four complete successes were Lane, Cohen, Igelsrud, and Sencert; the ages of the patients ranged from thirty-two to sixty-five; the operations were appendectomy, excision of an ovarian cyst, abdominal hysterectomy, and removal of biliary calculi; the method employed was in three cases the abdomino-subdiaphragmatic, in one the sterno-costal. The chief criticism applicable to these cases is that in three of them heart massage was begun not more than four minutes after cessation of the heart's action, and that possibly recovery might have occurred without it. In one, however, all other means had been adopted without result for twelve minutes, while in the four cases of temporary recovery a period of from ten minutes to an hour had elapsed. Sick's case, in which heart massage was begun an hour after apparent death, is very remarkable. The body was becoming cold, the incision to expose the heart did not bleed, the heart was flaccid and had already cooled to a marked degree *(schon stark abgekühlt)*. After rhythmical compression of the heart for

between a quarter of an hour and half an hour, regular contractions were established. Consciousness fully returned, the patient lived twenty-four hours, and appears to have died rather from respiratory causes, the heart having been reached by the trans-costal route, and the patient having pleural and pulmonary disease.

Various auxiliary procedures have been adopted. Application of electricity directly to the heart seems to be positively dangerous. Intra-arterial injection *towards* the heart of a modified normal saline solution has given encouraging results in animals, but has not been tried in man. Intravenous injection of large quantities of chloride of potassium—a method successful in animals in the hands of d'Halluin—would require very careful handling in the human subject, the salt being a myocardial poison.

It seems not unjustifiable to make the following assertions regarding massage of the heart in sudden cardiac arrest under an anæsthetic: It may save the patient when nothing else will succeed. The best route is through an abdominal incision, the diaphragm being left intact. The technique is easy and not dangerous. It is essential that artificial respiration should be simultaneously continued. Massage should be begun within five or six minutes of cardiac arrest, if other means have produced no result. During a laparotomy it can be begun at once. Longer intervals, even up to an hour, do not, however, necessarily render success impossible.

OBSTETRICS

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Cæsarean Section.—In these days when Cæsarean section, in its improved form, carried out under aseptic precautions and with careful suturing of the uterine wound, is being more commonly adopted in cases of difficult labour, such occurrences as that recorded by A. Fruhinsholz (*Annales de gynécologie et d'obstétrique*, Ann. xxxiii. p. 135. mars 1906) are likely to be more frequently met with. The patient was a woman, 30 years of age, deformed by achondroplasia; and the available conjugate diameter of her pelvis was 5.9 cm. (about 2⅓ in.). Her first two pregnancies ended in the delivery of the infants by basiotripsy at the full term. The third labour was brought to a satisfactory termination by the operation of Cæsarean section, performed

by Dr Schuhl; the child, weighing 2980 grammes, was saved. After the operation the uterus remained fixed to the posterior abdominal wall, the fundus lying about 15 cm. (6 in.) above the symphysis pubis. In the fourth labour Cæsarean section was again performed, on this occasion by Dr Herrgott, who found some difficulty on account of adhesions. The placenta was found on the anterior wall of the uterus, and caused trouble. Retraction was incomplete on account of the old adhesions. The child was born asphyxiated, but was resuscitated. At the end of eighteen days the uterine fundus was still 20 cm. (8 in.) above the symphysis pubis. The fifth labour came on prematurely (beginning of the eighth month), and for the *third time* Cæsarean section was performed, Dr Herrgott being again the operator, with Dr Fruhinsholz assisting him. Numerous solid utero-parietal adhesions were found, and the uterus showed marked torsion (the anterior surface facing towards the left). Some of the adhesions had to be cut, and then the uterine cavity was opened by means of a new incision more to the right side. The child was alive, but died soon afterwards. The uterus retracted only so far as the adhesions allowed; it could not be thoroughly compressed so as to stop the bleeding, and so recourse had to be had to compression of the abdominal aorta until the stitches were inserted. The placenta was inserted low down and to the front. The patient made a good recovery, but, as before, the uterus remained large and attached to the posterior abdominal wall. The sixth pregnancy ended in an abortion about the fifth month; a good recovery was made. This case proves that even the repeated performance of Cæsarean section and the setting up of utero-parietal adhesions do not interfere with the fertility of the patient, although they may introduce difficulties into the technique of the later sections. Fruhinsholz has also collected statistics of 27 cases of repeated Cæsarean section in which the weight of the infants was noted; his conclusion is that the fœtal weight tends to increase in successive pregnancies, and that even when utero-parietal adhesions exist it remains practically equal or even shows a slight tendency to rise. The present case is particularly interesting in that a uterus which had been three times sectioned was yet able without artificial aid to expel a five months' fœtus without rupturing or showing signs of inertia. The trend of the paper is to establish the safety for mother and child of repeated Cæsarean sections, even when these are accompanied by the setting up of adhesions. On the other hand, Couvelaire (*Ann. de gynéc. et d'obstét.*, Ann. xxxiii. p. 148, 1906) describes a case in which the cicatrix of a former Cæsarean section gave way at the end of a pregnancy complicated by hydramnios. The first labour of this patient (now 28

years of age) required to be terminated by Cæsarean section. She had an obliquely contracted or Naegele pelvis, diagnosed by palpation, pelvimetry, and the Röntgen rays (the fœtal head lying above the brim, it was possible to get a radiogram). There was slight hydramnios. The Cæsarean section was carried through without mishap, and the uterine incision was closed by a double series of catgut sutures. The patient made a good recovery and nursed her infant for sixteen months. She aborted at the second month about seventeen months later. Her third pregnancy had nearly reached the full term, when the degree of hydramnios (which was present) became excessive, and the fundus uteri reached to a height of 47 cm. above the symphysis pubis. The patient was awakened during the night by a violent pain in the abdomen, which continued. It was at first regarded as labour pains, but the condition of the woman rapidly became grave. The abdomen became sensitive to touch, there was a tendency to syncope, lividity of the face and extremities, perspirations on the face, and a pulse of 140. Dr Couvelaire performed abdominal section as quickly as possible. At once he came upon a quantity of blood-stained fluid and the fœtus lying free among the intestinal coils. The child, a male, weighing 3510 grammes, was extracted; it was dead. The uterus was free from adhesions, and showed a large tear in the anterior wall, through which the placenta, entirely separated, protruded. The uterus was brought outside the abdomen and amputated above an elastic ligature; the stump was fixed in the abdominal wound. Previous to the closure of the abdomen the cavity was cleaned out, and three drains were placed *in situ*, one in the pouch of Douglas and one in each iliac fossa; these drains were fixed in the lower end of the abdominal wound. The abdomen was closed with silver wire sutures, removed on the ninth day. The patient made a complete recovery. The anatomical examination of the parts showed that the placenta had been situated on the cicatrix of the old Cæsarean section, and that the tear had taken place, not in the fibrous cicatrix, but at its margin.

Dr Couvelaire appends to the description of this new case the details of eight somewhat similar accidents previously recorded (between 1896 and 1905) by Guillaume, Woyer, Targett, Everke, Meyer, Ekstein, Koblank, and Prüsmann. In the three cases in which there was a microscopic examination of the tear in the uterine wall the decidual elements were found almost under the peritoneal covering in the area of the old cicatrix, showing that there had been considerable thinning of the wall at this point. All the nine cases ruptured in the two last months of pregnancy; and in two instances (Woyer's and Couvelaire's) the uterine dis-

tension had been excessive, on account of twins and hydramnios in the one and on account of hydramnios in the other. Couvelaire thinks that it is not improbable that the insertion of the placenta on the thinned-out old cicatrix predisposed to the rupture. A remarkable fact, however, is the rarity of rupture of the uterus after the performance of a Cæsarean section (9 recorded cases in twenty years); and this may be ascribed to the aseptic modern methods and to the care taken in suturing the uterine wound. The already quoted case of Fruhinsholz demonstrates this. It might be well in cases of uterine overdistension (twins or hydramnios) to perform Cæsarean section before the arrival of the full term.

Extra-Uterine Pregnancy.—Carlo Meda (*Annali di ostetricia e ginecologia*, Ann. xxviii. p. 199, Feb. 1906) has investigated the occurrence of uterine pregnancy after an extra-uterine one. He has collected together a large number (128) of cases, and has reported four personal observations. In one class he places all the cases of uterine pregnancy following upon ectopic gestations which were not operated upon; of these there were 91. In 38 of these the subsequent labours presented no peculiarities, while in 53 there were special complications. The oldest case in the first group was apparently that reported by Boulduc in 1721, in which a woman carried a lithopædion in one Fallopian tube for 46 years, and was twice confined of living children. Middleton's two cases also occurred in the eighteenth century (1747, 1756): in one instance there was a lithopædion; and in the other fœtal bones had been expelled for a period of 18 years. In the labours showing complications the symptoms varied considerably, and among them may be named rectal pressure, premature confinement, preternatural presentations and prolapse of the cord, abortion with death from hæmorrhage, rupture of the ectopic sac, peritonitis, Cæsarean section, etc. In a second class Carlo Meda has placed the cases (37 in number) in which a subsequent intra-uterine pregnancy occurred in a patient who had been operated on for ectopic pregnancy; in 32 of these the subsequent pregnancy showed no anomaly, while in 5 it did. One of the most interesting of the records of this second class (the operated cases) was that reported by Lawson Tait in 1888. Abdominal section was first performed for a ruptured right tubal pregnancy; eighteen months later the patient had a normal full time intra-uterine pregnancy and labour; and thereafter there was a new ectopic pregnancy, on this occasion in the left tube, with rupture of the sac, bleeding, and death of the mother. Of the author's four cases, one was treated by colpotomy, the pregnant tube removed, and a normal labour followed a year later;

another was treated by abdominal section and marsupialisation of the sac, and she also had a normal labour afterwards; a third had the usual treatment (abdominal section and removal of the pregnant tube), and this was followed by an uneventful confinement; while in the fourth case an ectopic gestation (left-sided hæmatosalpinx) was diagnosed and treated expectantly, and the patient had three normal labours at intervals afterwards. Out of 14 cases of ectopic gestation with which Meda has had to do, 4 (or 28.5 per cent.) have been followed by normal labours. It not uncommonly happens that a second ectopic pregnancy follows a first in the same patient; but Meda believes that this is not so frequent an occurrence as is the supervention of an intra-uterine gestation. The cases of ectopic pregnancy which received suitable surgical treatment had a better prognosis in respect to future labours.

Menstruation.—Bernard Engländer (*Zentralblatt für Gynäkologie*, No. 7, p. 211, 1906) has been investigating the date of return of menstruation after abortion. After a full time labour it is generally supposed that from six to eight weeks must necessarily elapse before the uterine mucosa is restored and capable of causing a menstrual flow; but no time is clearly fixed for the return of the menses after an abortion. From the analysis of 57 abortions during the first four months of pregnancy, Engländer found that in 36 menstruation returned at the fourth week, in 8 in the fifth, in 6 at the end of the fifth, in 2 in the sixth, in 4 at the end of the sixth, and in 1 at the end of the third week. Curiously enough the woman who menstruated three weeks after her abortion had normally the twenty-one day type. The practical conclusion is that we ought not to be in a hurry to curette for bleeding returning four weeks after an abortion, unless there is other evidence of retention of decidual membranes, etc. The probable reason why the menses return earlier after abortion than after labour is to be found in the less marked changes which the uterus has undergone in the former as compared with the latter. In connection with the effect of lactation upon menstruation, it may be noted that Elis Essen-Möller (*Zentralblatt für Gynäkologie*, No. 6, p. 175, 1906) has found that in 59.3 per cent. of 428 nursing women, menstruation went on normally, no discharges occurred in 32-3 per cent., and 8.5 per cent. showed irregularities. The general conclusion to be drawn from Essen-Müller's statistics and from Meyer's is that menstruation occurs during lactation in about 60 per cent. of all cases, and may be almost regarded as normal. Further, in more than one-third (38 per cent.) of the women who menstruated during lactation, they began to do so between the first and

second months. Menstruation in primiparæ is apparently not so likely to occur during lactation. In another article E. Essen-Müller (*Zentralblatt für Gynäkologie*, No. 16, p. 453, 1906) gives statistics regarding the date of first appearance of the menses (the *menarché*) in Swedish women. Five thousand observations were made, and the vast majority (64.08 per cent.) of women had the menarché between 14 and 16 years (21.10 per cent. at 14, 26.38 per cent. at 15, and 16.60 per cent. at 16 years). Only 4 out of the 5000 (or 0.08 per cent.) menstruated as early as 10 years, while 3 (or 0.06 per cent.) were as late in beginning as the 23rd year.

New Books and New Editions

Natality and Fecundity. A Contribution to National Demography. By C. J. Lewis, D.Sc., M.D. Edin., and J. N. Lewis, F.I.A. Pp. 170. Edinburgh: Oliver & Boyd. 1905. Price 7s. 6d. net.

Only those acquainted with statistical methods, and the great care requisite in such procedures to obtain results of true value, can thoroughly appreciate the onerous labours involved in the production of this work. Taking possession of the rich and hitherto imperfectly cultivated field of statistics as provided in the Registrar General's returns for Scotland for 1855, Dr Lewis and Mr J. N. Lewis have garnered a splendid harvest of data, interesting alike to the hygienist, the physiologist, and the student of sociology. They deal not only with the 85,964 legitimate and the 7405 illegitimate births registered in that year, but with the ages of the parents and the number of previous offspring—data which this particular year was unique in providing. At the outset they distinguish between *fertility*, which in any population includes all the children produced by that population in a given time, and in which a triplet birth is counted as three, and *fecundity*, where the birth-transactions alone concern us, a triplet birth being thus but a single event. The work is so full of precise and severe details that it is impossible within the limits of a short review to give any that will be of value to the casual reader. The work itself must be consulted, and there will be found in it the most exact information regarding such points as the ages of the wives—mothers, and of the husbands—fathers, in legitimate births, of the fathers and mothers in illegitimate parturitions, of the children grouped according to the fathers' and mothers' ages, of the comparative fecundity of males and females for various age-groups, of multiple births (there were eleven

cases of triplets that year in Scotland), and so on. An interesting chapter deals with masculinity, or the ratio of the sexes at birth, the female figure being expressed as 1000. In Scotland the average masculinity from 1855-1901 was 1053, a moderate figure, and below that of many European countries, including Italy, Spain, Portugal, and Greece, but being above that of France.

The work concludes with a full bibliography, and we can heartily recommend it to all interested in, or concerned with, statistical inquiries.

Unconscious Therapeutics; or the Personality of the Physician. By ALFRED T. SCHOFIELD, M.D., M.R.C.S. Second edition. Pp. 317. London: J. & A. Churchill. Price 5s. net.

THE subject of this work is by no means a novelty to those who have anything more than a bowing acquaintance with medical literature on its more purely literary side. But in the overcrowding of the medical curriculum with "pass" subjects, it is to be feared that few medical students have any familiarity with such charming writings as *Horae subsecivae*, Paget's *Essays*, or Osler's *Aequanimitas*. Now and again an introductory or a valedictory address may raise the question as to whether the young medical practitioner is after all completely equipped for his life-work when he knows the latest about the immunity theory, or the advantages of inserting the ileum into the rectum, or when he can diagnose pancreatic disease from the urine. But some judicious counsel on the lines followed in this book of Dr Schofield's might make all the difference between success and failure in practice. True it is that most men have sufficient *savoir faire* to form practical rules for themselves for their conduct towards patients, after getting some sharp raps over the knuckles it may be; but others, not a few, may blunder along for years, wondering why other men with less ability should be so much greater favourites with the public. They may try to save their face by a sneer at their rival's "bedside manner," or popularity-hunting methods, but nevertheless they might be willing enough to step into the shoes of the successful doctor if they only knew how. There are, no doubt, men in the profession of the parasite or flunkey class, whose ways are not to be praised, and a lamentable admission it is. But, on the other hand, a brusque manner, inattention to the *nuances* of cultivated society, or inability to make evident the sympathy which may be really felt, are undoubtedly serious defects, which may quite prevent

other qualities of heart and head from having a chance of being displayed.

We could wish that every young graduate had the advantage of Dr Schofield's advice; many practitioners of standing, too, would rise from the perusal of this book with the feeling that it was distinctly helpful. Whether the subject is the physician's own personality, or the way in which he can best affect the mind, and thereby the body, of his patient, many important things are lucidly said here. "A doctor can, at any rate, make a point of so disciplining and training himself as to infuse at least three ideas into the patient's mind at every visit: (1) that the case has his whole and undivided attention; (2) that he thoroughly understands it; and (3) that he believes he can cure it, or, at any rate, takes a hopeful view of it. There are, of course, in every doctor's experience, sad occasions when the third, and sometimes even the second, is impossible, but these are rare."

There are many quotations in the book, but they are mostly from good writers. We could wish omitted some sarcastic references to the author of "The Young Practitioner." They are not in good taste to say the least. We note too a misprint which occurs also in another of Dr Schofield's works—Ford of Zürich should be Forel (p. 175).

A System of Medicine by Many Writers. Edited by THOMAS CLIFFORD ALLBUTT, M.A., M.D., LL.D., D.Sc., F.R.C.P., F.R.S., F.L.S., F.S.A., Regius Professor of Physic in the University of Cambridge, and HUMPHREY DAVY ROLLESTON, M.A., M.D., F.R.C.P., Physician to St George's Hospital, etc. Vol. i. Second edition. Pp. 1209. Macmillan & Co. 1905.

TEN years after the publication of the first instalment of that classical work, Allbutt's "System of Medicine," we have the pleasure of welcoming the first volume of a new edition, edited by Professor Clifford Allbutt and Dr Rolleston. A new volume, corresponding to one of the former edition, will be brought out each year.

Volume i., dealing with Prolegomena and the Infections, has been enlarged by the addition of over 200 pages and nine new plates illustrating the motor points, after Schatzsky, the blood corpuscles, etc. There are also many new illustrations throughout the text, among the most noteworthy being those in the useful article by Dr Francis H. Williams on the Use of X-Rays in Medicine, and in Professor Adami's admirable and exhaustive contribution on Inflammation.

A number of the articles have been entirely rewritten, whilst

others on fresh subjects are included. Thus the first article—on the History of Medicine—is a new and interesting contribution by Professor Clifford Allbutt and Dr Payne. The valuable article on Medical Statistics has been entirely rewritten by Dr Tatham, of Somerset House, and that on New Growths by Dr F. W. Andrewes, who suggests that, in the treatment of malignant tumours, a heterotype mitosis may prove a more elusive foe than a pathogenetic yeast. The late Mr Haviland's essay on the Medical Geography of Great Britain has been replaced by Dr Clemow's more general article on Medical Geography. Sir Hermann and Dr Parkes Weber contribute an article on Old Age. The article on Dietetics has been considerably enlarged, and the section on the physiological principles of that important subject is from the pen of Dr Robert Hutchison. Physical Exercises are dealt with by Mr E. M. Corner; Massage is considered in an article by Dr J. K. Mitchell. The article on the Examination of the Blood is now included in the first volume. To the article on Fever, sections on "Physiological Considerations" and "Clinical Considerations and Treatment" have been added.

The contributions on the General Pathology of Infection, Puerperal Septic Disease, Furuncle, Epidemic Pneumonia, Cholera, and Plague, which formerly appeared in Vol. i., are not included in the first volume of the new edition. The article on Diphtheria has been to a large extent rewritten, and a note added on Intubation. Professor Lorrain Smith contributes the new section on the Bacteriology of Enteric Fever, and on Paratyphoid Fever, while the bacteriological section on Relapsing Fever is from the pen of Dr Bulloch.

All the articles in the volume are characterised by their thoroughness, and some by their brilliancy; and if the high level of excellence is maintained in succeeding volumes, the work will retain the foremost place among the Systems of Medicine.

A Text-Book of Physiology for Medical Students and Physicians. By WILLIAM H. HOWELL, Ph.D., M.D., LL.D., Professor of Physiology in the Johns Hopkins University, Baltimore. Philadelphia and London: W. B. Saunders & Co., 1905. Pp. 905.

WHEN a Text-book of Physiology appears from the pen of so accomplished a Physiologist as Professor Howell of the Johns Hopkins University, one naturally expects a work of distinction. In the present book these expectations are in no way disappointed. It is admirable in arrangement, lucid in diction,

and thoroughly abreast of the present state of our knowledge of physiological science. The physician will find it a most valuable work of reference, and to him its utility will be greatly enhanced by the well-selected references to the literature of the various parts of the science. To the honours student, too, the book will be invaluable. In the preface the author says: "He who seeks for the truth in any matter under discussion is oftentimes forced to be satisfied with a suspension of judgment, and the writer who attempts to formulate our present knowledge upon almost any part of the subject is in many instances obliged to present the literature as it exists and let the reader make his own deductions. This latter method is doubtless the most satisfactory and the most suitable for large treatises prepared for the use of the specialist or advanced student, but for beginners it is absolutely necessary to follow a different plan. The amount of material, and the discussion of details of controversies, must be brought within reasonable limits. The author must assume the responsibility of sifting the evidence and emphasising those conclusions that seem to be most justified by experiment and observation. As far as material is concerned, it is evident that the selection of what to give and what to omit is a matter of judgment and experience upon the part of the writer, but the present author is convinced that the necessary reduction in material should be made by a process of elimination rather than by condensation. The latter method is suitable for the specialist with his background of knowledge and experience, but it is entirely unfitted for the elementary student. For the purposes of the latter, brief, comprehensive statements are oftentimes misleading, or fail at least to make a clear impression. Those subjects that are presented to him must be given with a certain degree of fulness if he is expected to obtain a serviceable conception of the facts, and it follows that a treatment of the wide subject of physiology is possible when undertaken with this intention, only by the adoption of a system of selection and elimination."

To the ordinary student of Medicine a sound elementary knowledge of the outlines of Physiology is absolutely essential for his future study of Medicine, and the prime object of a text-book must be to enable him to acquire this knowledge within the all too brief part of his five years of study which he is able to devote to Physiology. From an experience of such ordinary pass students, we fear that the present text-book will prove for them too ~~elaborate and difficu~~lt. The author of a book suitable for such men must assume still greater responsibility in sifting evidence and presenting the main facts of the science in a more readily assimilable form, and he must exercise

the most severe self-denial in refraining from introducing matter which, although of the greatest possible scientific interest, has no special bearing upon medical education.

We are glad, however, that Professor Howell has not thus limited himself, but that he has given himself a sufficiently free hand to prepare a book which the educated physician and the advanced student may read with pleasure and profit.

Fifteenth Annual Reports of the Medical Officer of Health to the County Councils of Stirling and Dumbarton. (Year 1905.) By JOHN C. M'VAIL, M.D., D.P.H. Camb., F.R.S.E. Pp. 136 and 86. Glasgow: William Hodge & Co.

THESE reports follow, as usual, similar lines, though they vary in detail according to the different experience of the two counties during the year. In both cases Dr M'Vail has prefaced the details of his report by the insertion of an interesting review of sanitary progress since 1889. This refers to Scotland in general and to the counties under his charge in particular, and the review takes special note of improvement in water-supply, drainage, lighting, and scavenging. During 1905 the question of the administrative control of phthisis has been brought before the Local Authorities by Dr M'Vail, and its discussion postponed pending the issue of a circular on the subject by the Local Government Board. This has now been issued, and the action of the Local Authorities on it and on the memorandum of their medical officer will doubtless form a prominent feature in the annual report for the present year. Last year was a healthy one, and was characterised by a diminution in the notified cases of infectious disease and by a low death-rate, while the birth-rate, in Stirlingshire at all events, maintained a satisfactory high level and was greater than in the three preceding years. Local outbreaks of measles and other diseases are fully described, and Dr M'Vail, as in his report for the previous year, refers particularly to the conditions of school closure as a preventive of the spread of infectious disease. The distribution of institutional deaths in the correct calculation of death-rates forms the subject of a section of the report, and a uniform system of dealing with these deaths should be arranged for the whole country. With Dr M'Vail's remarks on this subject, all who are interested in the accuracy of such rates will agree.

All Communications—including **BOOKS** *for* **REVIEW** *and* **EXCHANGE JOURNALS**—*are to be addressed to* THE EDITORS, 7 *Manor Place, Edinburgh*, AND NOT TO 43 CASTLE STREET.

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